INTERNATIONAL ABSTRACTS OF SURGERY

VOLUME 94 MAY, 1952 NUMBER 5

COLLECTIVE REVIEW

PROTEIN NUTRITION IN SURGICAL PATIENTS

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THE protein requirements of normal individuals have been variously estimated. The requirement is influenced by other dietary factors, by the size of the individual, and by various physiological states of the individual such as growth, degree of activity, pregnancy, and lactation. Another important variable is the chemical constitution of the protein itself and its over-all acceptability to the organism.

The detailed consideration of the available data on all of these factors is somewhat beyond the scope of this chapter. However, assuming a healthy adult engaged in only moderate activity, animal protein of good quality, such as casein or lean meat, no special physiological stresses, and an abundant nonprotein caloric supply, it has been shown that nitrogen balance is possible on 20 grams of protein per day.

A more useful figure, however, is that recommended by the Food and Nutrition Board of the National Research Council in their "Recommended Dietary Allowances" (Revised 1948) (20), which is 70 grams of protein per day for men and 60 grams of protein per day for women. It is not suggested that this figure is optimal for individuals under stress. In fact, in a booklet on therapeutic nutrition, subsequently published under the auspices of the Food and Nutrition Board of the National Research Council, larger allowances are recommended for patients recovering from serious illness or operation.

Prepared with the collaboration of the American College of Surgeons' Committee on Nutrition of the Surgical Patient in Relation to Preoperative and Postoperative Care, November, 1951. (See page 425.)

CAUSES OF PROTEIN DEFICIENCY IN SURGICAL PATIENTS

In many surgical patients, the factors increasing the nitrogen loss are direct ones, such as hemorrhage from peptic ulcer, loss of serum from burned surfaces, prolonged drainage of pus as from empyema cavities, loss of food from small bowel fistulas, or loss of plasma from the circulation as in small bowel obstruction (18), or peritonitis. These conditions can lead to the "loss type" of hypoproteinemia. Some concept of the losses arising may be gained from Table I which is based on studies of the literature.

Surgical patients may also develop the "lack type" of hypoproteinemia either because of inability to eat and assimilate food, as in individuals with carcinoma of the esophagus or of the pyloric region, or because of dietary restrictions, as are so often recommended in the treatment of peptic ulcers. While it has been recognized for a long time that patients with malignancy of the alimentary tract were particularly prone to the development of reduced plasma protein concentration, the frequency of the reduction in circulating plasma protein was not realized in patients with lesions of the gastrointestinal tract in general until measurements of the plasma volume were carried out routinely. Table II shows the deficits of plasma volume in 10 consecutive patients admitted to a general surgical division for gastric operations, and Table III shows similar data for a series of patients admitted for colon resections. Plasma volume measurements were made by the dye method with T-1824. It is evident, therefore, that in these two groups of patients the deficits of blood volume averaged about 2 pints per patient.

TABLE I.—NITROGEN LOSSES IN VARIOUS TYPES OF SURGICAL PATIENTS

(Collected from the Literature)

A. Losses before operation

	N Loss in grams	Period in days
Bleeding Peptic Ulcer		
Loss due to hemorrhage from duodenal ulcer (on basis of amount of animal blood administered into the gastrointestinal tract to produce a corresponding azotemia) (Bockus, 4)	17.28	
Loss calculated from fall in hemoglobin to 50% over 5 day period of bleeding from duodenal ulcer (ignoring probable decrease in blood volume) (Bockus, 4)	90.72	5
Superficial Thermal Burn		
Surface loss of serum protein from a severe burn per day (Hirshfeld *et al.*, 25)		
a. From burn surface	7.84	1
b. Total nitrogen loss	30.88	1
Small Bowel Obstruction		
Loss of plasma from circulation in an acute small bowel obstruction (Fine *et al.*, 18)	11.04	1

B. Losses during operation, based on 3 grams of nitrogen per 100 c.c. of blood

	Grams nitrogen		
	Minimum	Average (No. of Cases)	Maximum
Radical mastectomy (Coller *et al.*, 10)	15.0	24 (4)	31.5
Thyroidectomy (Coller *et al.*, 10)	3.0	12 (8)	21.0
Secondary operations on the biliary tract (Coller *et al.*, 10)	4.5	18 (8)	43.5
Abdominoperineal resection (Coller *et al.*, 10)	6.0	12 (12)	21.0
Gastric operations (complicated) (Coller *et al.*, 10)	9.0	18 (3)	24.0
Operations involving large body surfaces (Coller *et al.*, 10)	13.5	36 (3)	42.0
Lobectomy (Miller, Gibbon and Allbritten, 35)	21.0	54 (13)	87.0
Pneumonectomy (Miller, Gibbon and Allbritten, 35)	21.0	57 (16)	108.0
Esophagectomy (Miller, Gibbon and Allbritten, 35)	39.0	57 (7)	76.5
First stage thoracoplasty (Miller, Gibbon and Allbritten, 35)	12.0	22.5 (10)	60.0
Thoracotomy (Miller, Gibbon and Allbritten, 35)	10.5	31.5 (11)	51.0

TABLE I.—NITROGEN LOSSES IN VARIOUS TYPES OF SURGICAL PATIENTS—CONTINUED

C. Losses after operation

	N Loss *in grams*	Period *in days*
Hernia repair (Howard *et al.*, 26)	42.2	6
Herniotomy (Brunschwig, 5)	18.0	10
Subtrochanteric osteotomy (Howard *et al.*, 26)	65.0*	2 wks.
Craniotomy (Riegel *et al.*, 49)	57.5	5
Gastric resection (Riegel *et al.*, 49)	54.0	5
Rankin resection of colon (Riegel *et al.*, 49)	37.0	5
Cholecystectomy (Brunschwig, 5)	114.0	10
Gastric resection (Brunschwig, 5)	175.0	10
Acute appendicitis (peritonitis) (Brunschwig, 5)	49.0	10
Repair, perforated peptic ulcer (Brunschwig, 5)	136.0	10
Radial mastectomy (Brunschwig, 5)	15.0	10
Partial colectomy (Brunschwig, 5)	69.0	10
Gastroenterostomy (Brunschwig, 5)	48.0	10

*Average of 3 patients.

In addition to "loss" and "lack" types of hypoproteinemia, there are instances of hypoproteinemia due to inability of the individual to synthesize plasma proteins properly. In nephrosis, Epstein (17) maintained that this was a factor and that the albuminuria could not entirely account for the persistent hypoproteinemia that developed. Likewise, in cirrhosis and probably in parenchymatous liver disease without frank cirrhosis, there is an impairment in plasma protein production. Whipple and his associates (31) have demonstrated, in dogs, some decrease in the efficiency of conversion of dietary protein to plasma protein after various types of infection. Since surgical conditions may co-exist with the lesions of the sort just described, the surgeon will, from time to time, encounter patients who present special problems or difficulties in protein nutrition not as readily correctible by increasing the supply of protein as in the generality of surgical patients. A further discussion of the relation of protein nutrition to patients with hepatic disease will be presented in a subsequent section.

PROTEIN CATABOLISM IN RESPONSE TO INJURY

Inflammatory processes, whether brought about by trauma, infection, or both, have a profound effect on the nitrogen equilibrium in experimental animals and man. This effect consists in stimulation of the protein catabolism as measured by the nitrogen output when the kidneys are competent. When the kidneys are not competent to excrete the additional nitrogen, a rise in blood nonprotein nitrogen generally occurs. It is recognized that the endocrine glands, particularly the pituitary-adrenal axis, play an important role in the metabolic response to injury. In the present state of our knowledge, it is difficult to put this information to practical use except when clear evidence of adrenocortical insufficiency develops.

A classical experiment in this field was carried out by Whipple and his associates (58) who injected 1 cubic centimeter of turpentine hypodermically in dogs with the resultant formation of

a sterile abscess. The animals showed a profound loss of protein—equivalent to most of the so-called "labile protein" in the body. Labile protein is the amount of protein which may be removed from an animal maintained on a known protein intake by repeated plasmapheresis, over and above the amount of protein which such an animal still forms on the diet after plasma protein formation has stabilized. In other words, it is conceived of as the stored protein moiety which can quickly be converted to plasma protein when the latter is depleted.

One would expect, therefore, that most surgical patients, because of previous trauma, infection, or operation, would lose more protein than normal healthy individuals and, indeed, this has been found to be the case. Table IV cites the protein requirement for nitrogen equilibrium after a number of different operations, as found by various workers. It is essential to know the caloric intake of carbohydrate and fat in such studies as both of these substances have a protein-sparing effect. Indeed, in most surgical cases, the use of 1,000 c.c. or more of 5 per cent dextrose solution may provide enough glucose to alter the gluconeogenesis and nitrogen excretion materially (if we may transfer Gamble's data from his life-raft ration studies to the posttrauma patient [21]).

It will be noted that some authors, such as Cuthbertson (11), did not find it possible to establish nitrogen equilibrium by dietary means after fractures of the long bones. Howard (26), Moore (36), and others have raised the question of whether the maintenance of nitrogen equilibrium is desirable under such circumstances. No certain answer to this question has been found. Since the plasma-depleted animal is incapable of responding to injury by the usual increase in protein catabolism, it is tempting to believe that this protein breakdown serves some useful purpose in the organism, such as making protein breakdown products available in abundant quantity for repair purposes. It has been suggested that perhaps the repair of certain tissues requires unusually large amounts of particular amino acids and that others which are mobilized at the same time are not needed and are accordingly excreted after conversion, for the most part, to urea. This explanation, attractive as it is, seems to be without experimental substantiation.

That the protein catabolic process is of some utility to the animal, however, is borne out by the experiments of Ravdin, Vars, and Goldschmidt (44) in which it was shown that sterile inflammation produced by the injection of sodium ricinoleate in the rat protected this animal against liver injury from chloroform. These experiments were an extension of earlier experiments by Neale (40) in which the same type of protective action was shown to follow injections of sodium xanthine. However, the later experiments indicated that the effect was a nonspecific response to irritants and not a specific effect of sodium xanthine.

If one accepts the catabolic breakdown in response to injury as a teleological mechanism, it would then seem a question of whether the object of the reaction was to get rid of something harmful or to mobilize something useful. The experiments of Goldschmidt, Vars, and Ravdin (22), taken in conjunction with the later experiments of Ravdin, Vars, and Goldschmidt (44), and those of Messinger and Hawkins (34), in which the importance of protein in protecting the liver was reemphasized, would incline one to the latter view

TABLE II.—PREOPERATIVE DETERMINATIONS OF PLASMA VOLUME IN A GROUP OF PATIENTS WITH GASTRIC LESIONS; GENERAL SURGICAL SERVICE OF THE HOSPITAL OF THE UNIVERSITY OF PENNSYLVANIA

Name	Predicted plasma volume (ml.)	Measured plasma volume (ml.)	Plasma deficit (ml.)	Hematocrit (% cells)	Whole blood deficit (ml.)
M.L	2,800	2,260	540	46	980
M.R.	3,000	2,520	480	48	875
R.Z.	2,700	2,175	525	42	955
A.B.	3,500	2,665	835	42	1,680
J.S.	3,850	2,265	1,585	44	2,870
A.P.	4,500	3,600	900	45	1,560
F.L.	3,370	2,800	570	39	930
J.C.	3,290	2,840	450	38	730
S. div.	3,530	3,170	360	44	630
N.H.	4,050	3,490	560	36	1,890

TABLE III.—AVERAGE DEFICITS OF BLOOD VOLUME IN PATIENTS WITH CARCINOMA OF THE LARGE BOWEL

	Number of Patients	Age	Hematocrit (% cells)	Plasma volume (ml.)	Blood volume (ml.)	Theoretical normal blood volume (ml.)	Blood volume deficit (ml.)
Colon (above sigmoid)	15	60	40	2329	3869	5130	1191
Sigmoid and rectosigmoid	22	64	40	2794	4701	5493	793
Rectum	22	60	38	2851	4637	5398	763
Total average	59	61	39	2697	4466	5365	883

TABLE IV.—ESTIMATED NITROGEN REQUIREMENTS FOR EQUILIBRIUM IN THE EARLY POSTOPERATIVE PERIOD

	Nitrogen gm./kgm. day	Calories kgm./day
Gastrectomy—Riegel *et al.* (49)	0.30	30
Craniotomy—Drew *et al.* (12)	0.25	25
Gastrectomy—Werner (56)	0.40	16
Gastrectomy—Mulholland *et al.* (38)	0.39	57*
Herniorrhaphy—Werner (56)	0.21	not stated
Cholecystectomy—Werner, 1949** (57)	0.20	35

*Strongly positive balance.
**Calculated from the chart on the assumption that the patient weighed 70 kilograms.

in cases of liver injury. The same may not be true, however, of all types of injury, such as fractures of the long bones. In those types of injury in which it is true, it would certainly seem logical to strive for a positive nitrogen balance or at least nitrogen equilibrium by increasing the nitrogen intake in order that the body may continue to be provided with an excess of nitrogenous food as long as the injury requires it. The recent monograph by Moore and Ball (37) documents a sizeable series of complete studies of metabolic balance (nitrogen, potassium, and sodium) in surgical patients, as well as some endocrine experiments which cast light on the activation mechanism for the balance changes seen after trauma.

DEMONSTRATED DANGERS OF HYPOPROTEINEMIA

Protein is an essential constituent of all living cells, therefore it is to be expected that it will be needed for the repair of body tissues. It is also to be expected that a shortage of suitable dietary protein will lead to serious derangements in body function. It is probable that many such alterations remain to be distinguished more clearly in the future, but some of the dangers of the hypoproteinemic individual have been substantiated by experimental evidence. Some of the experiments may be subject to the criticism that they do not adequately rule out the possibility of other and simultaneous dietary deficiencies. However, as the hypoproteinemic individual commonly suffers from a decreased appetite, it is probable that clinical cases of hypoproteinemia seldom represent single deficiencies of protein but commonly reveal deficiencies of other dietary factors also. The dangers of hypoproteinemia are:

1. Retarded wound healing as shown in canine experiments by Thompson, Ravdin, and Frank (53), which indicated that hypoproteinemia, if severe enough, greatly reduced fibroplasia in abdominal wounds. This was quickly overcome if the plasma protein was restored at the time that the test incision was made and the animal was returned to a house diet (Thompson, Ravdin, Rhoads, and Frank (54)). The more frequent occurrence of wound rupture in patients with carcinoma of the alimentary tract, noted by Sokolov (51), is easily explained in this way. In a study of 20 cases of wound dehiscence occurring in the Detroit area, Hartzell, Winfield, and Irvin (23) found hypoproteinemia in every instance. In 95 per cent of them, however, there was also a vitamin C deficiency. The successful experience of Munro (39) in treating neurological patients with chronic ulcers with high protein intakes further attests to the value of protein in wound healing in man.

2. That the development of callus, as judged by x-ray examination after experimental fracture in dogs, is also retarded by hypoproteinemia was indicated by the experiments of Rhoads and Kasinskas (45).

3. Hypoproteinemia has a profound effect on the function of the alimentary tract. Attention was first called to this in patients who had had gastroenterostomies by Jones and Eaton (27), and apparently the hypoproteinemia accounted for many of the cases of persistent vomiting after these operations. Mecray, Barden, and Ravdin (32) demonstrated this relationship experimentally and showed that it was not confined to animals with recent gastric operations; they also showed that the gastric emptying time and the time for the head of a water barium meal to traverse the small bowel were both increased in inverse proportion to the concentration of protein in the plasma. Indeed, the existence of hypoproteinemia is often suggested by the roentgenologist when he examines a series of patients with gastrointestinal disturbances.

4. Susceptibility to hemorrhagic shock is increased in hypoproteinemic animals. Ravdin, McNamee, Kamholz, and Rhoads (43) found that, whereas an average of 45 cubic centimeters of blood per kilogram of body weight had to be removed in order to produce a hypotension of 60 or less, lasting 30 minutes in normal dogs, an average loss of only 25 cubic centimeters of blood per kilogram of body weight was sufficient to bring about this state in hypoproteinemic dogs which had been depleted of protein by plasmapheresis and a low protein diet. In view of the profound reduction in blood volume found in hypoproteinemic animals by Melnick and Cowgill (33) and by Weech and his associates (55) such results were to be expected.

TABLE V.—TREATED GROUP: 11 PATIENTS WHO RECEIVED FORCED FEEDING FOR 5 DAYS BEFORE OPERATION

Patient	Operation	Intake			Output	
		Total nitrogen preop. 5 days	Nitrogen /kgm./day preop. gm.	Calories /kgm./day preop. c.c.	Total nitrogen preop. gm.	Nitrogen balance first 5 days gm.
Ri.	Craniotomy	274.3	0.82	45	126.3	+148.0
Fe.	Craniotomy	302.8	0.89	49	168.6	+134.2
Sm.	Gastric resection	275.5	0.89	44	165.4	+110.1
Ho.	Craniectomy	220.2	0.77	45	152.1	+ 68.1
Wa.	Rankin resection	193.6	0.70	50	136.0	+ 57.6
Do.	Rankin resection	244.6	0.80	39	163.7	+ 80.9
Pa.	Gastric resection	260.2	0.83	38	146.7	+113.5
Th.	Craniotomy	271.7	0.86	42	200.3	+ 71.4
Wi.	Craniotomy	282.2	0.83	46	195.3	+ 86.9
Bo.	Craniotomy	319.8	0.89	50	181.7	+138.1
Sc.	Craniotomy	210.0	0.78	49	111.5	+ 98.5

5. Perhaps the most important effect of hypoproteinemia is its effect on the resistance to infection. This has been demonstrated in many ways by Cannon and his associates (9). The experimental animal is able to produce agglutinins to antigens such as killed typhoid bacilli less rapidly in the hypoproteinemic state (8). A similar result was obtained in patients by Wohl and his associates (59). The mortality rate of rats infected with living pathogenic bacilli is greatly increased by hypoproteinemia (50). Moreover, these evidences of increased susceptibility to infection are curable by the administration of complete proteins such as casein, but proteins deficient in certain amino acids, such as gelatin, are of little value when given as the sole source of protein.

The clinical applicability of this relationship is borne out in some degree by the increased incidence of infectious complications in hypoproteinemic patients. Various authors have observed that patients with severe burns who gradually lose ground nutritionally eventually succumb to invasive infection only after several weeks have elapsed since the injury, although they had presented the same or greater portals of entry for infection throughout this period.

THE RECOGNITION OF PROTEIN DEFICITS IN PATIENTS

While the extreme case of hypoproteinemia is readily recognized by peripheral edema and, at times, collections of fluid in serous cavities, the recognition of the earlier stages of protein deficiency is by no means easy, even by laboratory methods.

The measurement of the serum proteins separately or even in combination will reveal evidence of deficiency before clinical edema appears. The so-called critical level for edema formation is given as 5.5 grams per 100 milliliters for total serum proteins, and 2.5 grams per 100 milliliters for the albumin fraction which alone accounts for most of the colloid osmotic pressure of the plasma. However, the term "critical level" is misleading because the shift of water from the vascular compartment to the interstitial spaces is a gradual one tending to increase as the colloid osmotic pressure drops, and it is merely when in the leg it amounts to an increase of from 8 to 10 per cent of the total volume of that part that pitting edema becomes demonstrable as a clinical sign. It is evident from animal experiments that declines of the serum protein to levels considerably higher than the edema level represent substantial exhaustion of the labile stores of protein in the body. That is to say that these stores are called upon to replace serum protein fairly early in depletion so that any considerable decline in serum protein concentration signifies that such labile stores have already been exhausted to a large degree. It appears that reduction in plasma volume is apt to be a more sensitive indicator of loss of labile protein than serum protein concentration.

Probably the simplest indices we have to the loss of fixed proteins of the body are weight loss and to some extent dietary history. In practice, therefore, one is guided by the following considerations: (1) history of weight loss, (2) dietary history, (3) gross signs of hypoproteinemia and

TABLE VI.—RECOMMENDATIONS FOR NITROGEN INTAKE AND CALORIC INTAKE IN THE EARLY POSTOPERATIVE PERIOD

	Nitrogen gm./kgm. day	Calories kgm./day
A. Operations such as: Herniorrhaphy; Cholecystectomy (uncomplicated and without acute inflammation)	0.25	25
B. Operations such as: Craniotomy; Craniectomy; Appendectomy (with acute inflammation)	0.30	30
C. Operations of large extent likely to set up inflammation in body cavities: Gastrectomy; Colectomy; Abdominoperineal resection; Major thoracic operations	0.40	40

starvation, (4) serum protein concentration, (5) plasma volume, and (6) the total circulating plasma protein calculated from 4 and 5. Present evidence would indicate that the total circulating plasma protein is the most sensitive of these considerations.

As with the vitamins and other dietary constituents, there is uncertainty as to what constitutes a normal level of body proteins. If one uses saturation with a high intake as normal, as some authors have done in the case of vitamin C, nearly all surgical patients are probably deficient. For instance, Koop, Drew, Riegel, and Rhoads (28) found that of a series of 11 patients placed on an enteral intake of about 300 grams of protein per day before operation all retained large quantities of nitrogen (Table V). Seven of these patients had neurosurgical conditions and had no known lesions of the alimentary tract.

It does not seem reasonable to use such a test of saturation for the adequacy of protein nutrition and the data in Table V were not obtained with this in mind. Practical experience would indicate that a patient who maintained a normal blood volume and a normal concentration of the respective plasma protein fractions could be regarded as being in a satisfactory nutritional condition with respect to protein for a surgical procedure. At present, it is not possible to measure the labile protein reserve without destroying it.

There are certain pitfalls in the recognition of plasma protein deficiency which deserve mention. Dehydration may mask hypoproteinemia by producing hemoconcentration. Thus, a patient with pyloric obstruction may come to a hospital with a normal concentration of plasma protein and yet have a profound protein deficiency which will be revealed either by plasma volume measurements or by the prompt fall in the serum protein concentration following intravenous replacement of the water and salt lost by vomiting. A high serum globulin may conceal a serious decrease in the serum albumin level unless an accurate fractionation of the two major serum protein components is carried out.

MATERIALS AND METHODS FOR ACHIEVING NITROGEN BALANCE IN SURGICAL PATIENTS

1. Reduction of loss. The prevention of blood loss as far as possible during operation is important. The practice of leaving blood in the peritoneum in cases of ruptured tubal pregnancy is supported by good experimental evidence that such blood is absorbed to a substantial degree. Prompt hemostasis in patients with accidental hemorrhage should be obtained as quickly as possible. Massive gastrointestinal bleeding constitutes a special problem too complex to discuss here, but, once operation is decided upon, the sooner the patient can be made ready and operated on the less blood loss will occur. There are many other specific situations in which protein loss can be stopped or decreased by the timely application of surgical procedures. They are generally a matter of common sense but it is very important not to neglect them. The decision of when to close a small intestinal fistula may tax surgical judgment to the utmost and, at the same time, be a decisive factor in the patient's course.

2. The administration of protein and protein-sparing foods. The routes of administration are: (1) oral, (2) via gastric tubes, (3) via jejunal tubes, (4) rectal, (5) intravenous, (6) intraperitoneal, (7) subcutaneous, and (8) intramedullary. All authors agree that the oral route should be used unless it is contraindicated by the pathological conditions of the patient or by recent operation. When anorexia exists, it may often be overcome by changes in the environment of the patient, by better food, spiritus frumenti for those who like it, by bile salts or desiccated bile when the patient's biliary tract is not supplying the intestinal tract adequately, or by pancreatic enzymes when the supply of these is short. Small doses of insulin may be cautiously given from 15 to 30 minutes before meals in some cases. Occasionally, patients with severe anorexia will actually prefer tube feedings to the effort of eating. The use of polyethylene tubes, 2 to 3 mm. in diameter, has facilitated this method.

The orojejunal route (Stengel and Ravdin, 52), or the gastrojejunal route as suggested by Bisgard (3) has a special field of usefulness in patients undergoing gastric surgery in whom special difficulties with nutrition are anticipated. In general, the tube must be placed at the time of operation. Such a tube is not necessary in the ordinary patient undergoing gastric resection. Jejunostomy has been especially recommended to build patients up for major gastric surgery, especially in pyloric obstruction with vomiting.

All routes that deliver the nutrient mixture into the small bowel are prone to induce diarrhea with subsequent loss not only of much of the unabsorbed nutriment but also of water and electrolytes in amounts which complicate the management of the patient from this standpoint. This is explained by the observation of Ravdin, Johnston, and Morrison (42) in the dog and of Abbott, Karr, and Miller (1) in man, that one of the functions of the stomach is the dilution of food to a concentration acceptable to the small bowel. Thus, when 50 per cent glucose solution was introduced into the stomach, the highest concentration found in the duodenum was 7 per cent, and in the jejunum the concentration was never above isotonicity (5 per cent). When the pylorus is bypassed or removed, more concentrated solutions are generally delivered into the small bowel with the resulting disturbance in physiology. In the normal individual, the water used for dilution is added in the stomach and duodenum and reabsorbed in the colon so that it can be used over and over again. An adequate jejunal feeding in isotonic form with readily soluble foods, which are generally composed of small molecules, would require an enormous volume of water and this, of course, poses fresh problems. There are some individuals who handle jejunal feedings very well, but in others the therapeutic plans are thwarted by diarrhea in spite of large doses of tincture of paregoric and other measures aimed at preventing this complication.

The rectal route was used extensively during the end of the nineteenth century, but evidence was obtained that little absorption of the usual preparations occurred (Edsall and Miller, 14). Glucose is absorbed, but in such limited quantities as to be of little practical use (Ebeling, 13). That certain protein derivatives can be absorbed from the colon was demonstrated by Abderhalden, Frank, and Schittenhelm in 1909, (2), and by Folin and Denis in 1912 (19), and in the chronically isolated colon loops by Rhoads, Stengel, Riegel, Cajori, and Frazier (46). Predigested protein has had occasional clinical use by rectum in recent times, but most of the workers would agree that the method was at best uncertain in its results. It is not in general use and is not now recommended.

At present, the most widely used method of protein nutrition for patients who cannot take enough protein by mouth is the intravenous route. While Henriques and Andersen (24) demonstrated that they could keep a goat in nitrogen equilibrium by the injection of a casein hydrolysate, as early as 1913, the use of such hydrolysates achieved no place in clinical practice until Elman (15), working with a preparation produced by Mead, Johnson and Company, demonstrated that the method was practical. Since then, a great deal of work has been done in the field and satisfactory preparations have been made from casein and pancreas (amigen), from casein by acid hydrolysis with added tryptophane and tyrosine (parenamine), from fibrin (fibrin animosol), and by mixing pure essential amino acids "V U J plus glycine," which is not at present commercially available. This is not a complete list of the available products but represents the principal types available. It has been demonstrated that most patients will tolerate this material provided that not more than 50 grams of the hydrolysate is given in about 4 hours. Some individuals will tolerate it more rapidly, but many will develop nausea probably as the result of a slight accumulation of glutamic acid in the blood. Extreme sensitivity resulting in severe anaphylactic reactions is very rare but has been encountered (30). The urinary loss of amino nitrogen at these slow rates of administration is negligible (according to the experimental data of Elman, 16). However, there are no data on the relation of the rate of infusion with the ultimate utilization of amino acids for protein synthesis.

Whether food nitrogen administered in this way is utilized as efficiently as when given by mouth has been a question of considerable interest. The data of Riegel and her associates (29) on comparing the intravenous route with the jejunal route would indicate that a somewhat better nitrogen balance had been obtained in clinical trials when the material was given enterally than when given parenterally. This agrees with the general experience of others. There are, however, other more cogent reasons for using the enteral route when possible.

When the parenteral route *must* be used, utilization is fairly satisfactory. Available clinical data do not as yet establish any one preparation as being of greater nutritive value than others. All of the preparations considered so far in this report are derived from biologically complete proteins.

In considering the amino acid and protein hydrolysate preparations, it cannot be stressed too strongly that they are perfect culture media and that unless promptly and carefully used they may carry an overwhelming dose of bacteria into the blood stream. A cloudy preparation must never be given. A bottle once opened must be given at once, and if its administration is interrupted the remainder should be discarded. A rigid aseptic technique must be used including a closed system of administration with filtration of the air entering the flask.

The literature stresses two further questions. Are protein hydrolysates capable of building up plasma protein? Data now available indicate that they may be, provided the caloric requirements of the patient are covered and a positive nitrogen balance is maintained. The amount of retained nitrogen appearing as plasma protein has been small—approximately 3 per cent.

Another highly significant question is whether positive nitrogen balance may be achieved if the patient is not in caloric balance. There now appears to be general agreement that this is possible in short term studies. Elman (41) believes that 100 grams of the hydrolysate and 100 grams of glucose will generally be sufficient for the postoperative patient and reports positive nitrogen balance in postoperative patients on less than 1,000 calories per day. Riegel (49) attained positive balance in such patients only if they received the equivalent of about 200 grams of protein daily and about 1,000 calories, whereas 130 grams of protein with 2,100 calories frequently gave nitrogen equilibrium or only a slightly negative balance.

The variety of whole proteins suitable for intravenous administration in man is small because of the fact that most of these substances are antigenic. The chief ones are whole blood, plasma, and gelatin. The first two are of considerable value nutritionally and by increasing and maintaining the blood volume and colloid osmotic pressure they seem to meet the immediate needs of the protein-deficient patient better than anything else, in spite of evidence that utilization is slow. Thus, if the blood volume and plasma protein administration can be returned to normal values and maintained there, patients can often stand fairly extensive surgical procedures even though they have had nutritional deprivation sufficient to cause an extensive weight loss. This conclusion rests mainly on clinical experience and awaits further substantiation by controlled experiments. It is applicable especially to the preparation of patients with pyloric obstruction for gastric resection.

As Whipple and his associates (41) have shown, homologous plasma supplemented with a liberal supply of protein-sparing foods can maintain an animal in nitrogen equilibrium. They believe, therefore, that plasma protein can be used for the formation of other forms of protein in the body, and they have some evidence that it may not always be necessary for the plasma proteins to be broken down as far as amino acids before they are reformed into other body proteins.

In a protein-deficient individual, transfused plasma finds its way out of the circulation fairly rapidly so that it is not enough to restore the plasma volume and concentration once, but it is necessary to keep replacing that which leaves the circulation. Plasma from blood banks often contains only 12 grams of protein per 250 cubic centimeter units. It is, therefore, a very expensive material to use purely for nutritional purposes.

Gelatin is an incomplete protein, but Brunschwig and his associates (6) suggested that when it is given with the hydrolysate of a complete protein, it may be utilized to some extent. Additional studies indicate considerable utilization (Koop, Riegel, Grigger, and Barnes, (29)), (Rhode, Parkins, and Vars, (47)) in both animals and man.

Human serum albumin has also been studied for its nutritional value. Taking advantage of its high sulfur content, Riegel and Gimbel (48) were able to show that the positive nitrogen balance so readily achieved when human serum albumin is given by the intravenous route is largely due to its storage in the plasma and the interstitial fluid. Some, however, appears to be used for nutritional purposes. The material is too expensive to be widely used for nutritional purposes, but the studies cited are of significance because they suggest that more careful scrutiny of some of the balance studies may show that the factor of storage is greater than has been generally recognized.

It should be re-emphasized that the protein-sparing factors are intimately associated with the success of protein alimentation and are of equal importance. Suggested allowances for nitrogen equilibrium are given in Table VI.

MISCELLANEOUS CONSIDERATIONS

Different tissues in the body seem to have been accorded different priorities for protein when the latter is in short supply. Thus, Whipple and his associates have found that hemoglobin is restored more rapidly than plasma protein in animals depleted of both. The necessary iron must, of course, be available for the hemoglobin synthesis.

As Cannon (7) and others have pointed out, potassium is required for the deposition of glyco-

gen. To what extent clinical potassium deficiency may interfere with the utilization of glucose is not known, but the possibility of such interference may constitute an additional reason for correcting potassium deficiencies.

TWO REPRESENTATIVE CLINICAL PROBLEMS IN PROTEIN DEFICIENCY

A. The problem of a patient with anorexia nervosa who has lost 20 per cent of his body weight because of failure to eat.

Such a patient has a relatively normal alimentary tract, at least anatomically, and is a suitable candidate for enteral methods of nutrition. Assuming that efforts to prevail on the patient to take adequate nourishment by mouth have failed, a program of tube feeding can properly be instituted. A small plastic catheter, such as a 2 mm. polyethylene tube, may be introduced through the nose into the stomach.

A suitable feeding mixture for such a tube might be composed of the following:

	Gm.	Cal.	Prot. (gm.)
Amigen, oral	50	200	50
Dextrimaltose	50	200	
Sodium chloride	2		
Potassium chloride	1		
Homogenized milk	1,000	700	35
Total	1,103	1,100	85

While such a solution is too hypertonic for use in the jejunum, it is usually tolerated quite well in the stomach. Clinical experience indicates that it is unwise to start too intensive a program all at once. The first day, 1.5 liters of this solution may be allowed to go through the gastric tube by slow gravity drip—at a rate of from 80 to 100 cubic centimeters per hour. If this is well tolerated, it could be increased 500 cubic centimeters each day to a total of 3 liters per day which would provide 3,300 calories.

Vitamins can usually be provided in the form of multivitamin capsules.

B. The problem of a patient immediately after total gastrectomy for carcinoma occluding the pylorus.

Such a patient will ordinarily have a large accumulated nutritional deficit including a protein deficit, and most surgeons will prefer that the parenteral route of feeding be used during the early postoperative period.

In general, the plasma volume, the plasma protein concentration, and the hemoglobin concentration should be brought to normal before operation, by transfusion, and losses during operation should be compensated for at the time of operation.

Parenteral alimentation could then be provided as follows:

Per cent		C.c.	Cal.	Prot. (gm.)
10	Glucose in water	1,000	400	
5 5	Protein hydrolysate and glucose solution	2,000	800	100
5 0.9	Glucose and sodium chloride	500	100	
		3,500	1,300	100

This would be supplemented by 500 cubic centimeters of properly matched whole blood every 2 or 3 days until oral feeding was well established, and by parenteral vitamins, including B complex, C, and K.

It will be seen that such a regime falls short with regard to the caloric balance. It has the advantage that none of the solutions are of more than double isotonicity so that the veins of most of the patients will tolerate them with a change of infusion site once every 24 hours. It provides a fairly workable method of decreasing the nutritional deficits for the patient in whom an early resumption of oral feeding is anticipated.

If a serious attempt to achieve nitrogen and caloric balance is to be made, 4 liters of a solution containing 5 per cent protein hydrolysate and 10 per cent glucose, or invert sugar, can be given by continuous intravenous drip throughout the 24 hours. This will provide 2,400 calories including 200 grams of hydrolyzed proteins. Many, but not all, patients can receive this amount without excessive venous thrombosis on the one hand or pulmonary edema on the other.

The Committee on Nutrition of the Surgical Patient in Relation to Preoperative and Postoperative Care consists of the following members: Walter G. Maddock, Chairman, Clarence T. Berne, Frederick A. Coller, Michael E. De Bakey, Robert Elman, Everett I. Evans, Fraser N. Gurd, Charles C. Lund, Champ Lyons, Horace J. McCorkle, Francis D. Moore, Carl A. Moyer, John H. Mulholland, I. S. Ravdin, Jonathan E. Rhoads, John D. Stewart, Richard L. Varco, and Robert M. Zollinger.

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ABSTRACTS OF CURRENT LITERATURE

SURGERY OF THE HEAD AND NECK

EYE

Closed Branches of Conjunctival Vessels. ARNOLD LOEWENSTEIN. *Brit. J. Ophth.*, 1951, 35: 595.

The normal conjunctiva was examined with the slit lamp, with high magnification. Very fine capillaries, some containing erythrocytes and some empty, were seen. The empty capillaries were colorless, with a clear glasslike wall, best perceived in diminished illumination. These very thin capillaries became dilated and filled with blood after the instillation of dionin.

Razor slices of the conjunctiva showed some twigs of conjunctival vessels completely closed and filled with endothelial cells or lymphocytes. Many sphincters were found on these twigs. Some of the finest conjunctival capillaries at the limbus terminated in end capillaries, there being no returning vessel carrying the blood back to the venous side; some were filled with single erythrocytes while others had none. The termination at the limbus of certain capillaries was surrounded with gelatinous substance, the function of which is not known.

FRANK W. NEWELL, M.D.

Localization of the Lacrimal Sac in Dacryocystorhinostomy by Transillumination. LEONARD CHRISTENSEN. *Arch. Ophth.*, Chic., 1951, 46: 501.

The author describes a method of localizing the lacrimal sac intranasally by transillumination in dacryocystorhinostomy.

The establishment of a communication between the sac and the nasal cavity by an approach from the nasal cavity has advantages. This approach is not difficult for the otolaryngologist who is familiar with the nasopharynx. Orientation is obtained by transillumination with a transilluminator, based on the old principle of the transmission of light along a plastic rod. When the plastic nasolacrimal probe which fits an external light source is inserted into the nasolacrimal sac against the surface of the nasal bone, light is readily seen in the nasal cavity. The point of transillumination marks the site for incision and entrance into the nasolacrimal fossa. After an opening has been made in the bony wall, the sac is easily identified again by using the lighted probe, so that excision of a part of the wall can be carried out in the usual manner. JOSHUA ZUCKERMAN, M.D.

Tumor of the Lacrimal Gland. A. RAY IRVINE, WALTER L. ROBERTS, and PETER S. SOUDAKOFF. *Am. J. Ophth.*, 1951, 34: 1511.

Four cases of primary adenocarcinoma of the lacrimal gland are presented. In 3 cases the growths were classified as mixed tumors and in 1 case the tumor was of alveolar type.

The symptoms were exophthalmos, proptosis, decrease in visual acuity, enlarged swelling at the outer canthus, and limitation of movement of the eye in the direction of growth.

Treatment consisted of extirpation of the growth. The prognosis is good in adenocarcinomas of mixed type. With a good result, proptosis disappears, movement of the eye is restored, and visual acuity returns.

The anatomic data fails to explain how the nerve can be stretched so far and yet maintain its normal function. It must be that stretching occurs slowly—the nerve, in some way, elongating in compensation.

EARL H. MERZ, M.D.

A Mixed Tumor of the Lacrimal Gland with Extensive Metastases. WORTHY W. MCKINNEY and WILLIAM C. BUTZ. *Am. J. Ophth.*, 1951, 34: 1519.

The authors present a case of mixed tumor of the lacrimal gland with repeated excisions and recurrences. Later, extensive metastases spread to the pleura, lungs, and lymph nodes.

These tumors definitely tend to recur in spite of drastic surgery and once metastases form, the growth becomes more active and rapid. Heavy x-ray dosage was unable to check the progress.

Suggested treatment is early and complete excision with careful observation later.

EARL H. MERZ, M.D.

Effect of Cortisone on Healing of Corneal Wounds. NORMAN ASHTON and CHARLES COOK. *Brit. J. Ophth.*, 1951, 35: 708.

The authors discuss the effect of cortisone on the healing of perforating wounds of the rabbit cornea.

The effect of cortisone on the healing of perforating corneal wounds in the rabbit was studied by means of small subconjunctival doses of cortisone corresponding to the usual therapeutic level, and by the use of larger nontherapeutic doses.

It was found that cortisone inhibits the formation of a fibrinous coagulum, cellular infiltration, fibroblastic repair, and endothelial regeneration. The inhibition was related to the quantity of cortisone administered; it was moderate with small doses (with which the final stage of healing was impaired but adequate), and it was severe with large doses (with which healing may be completely prevented).

When cortisone is indicated immediately following intraocular operation, only minimally effective doses should be used in order to avoid undesirable complications. JOSHUA ZUCKERMAN, M.D.

Effect of Cortisone upon the Vascularization Which Follows Corneal Burns. A. LISTER and D. P. GREAVES. *Brit. J. Ophth.*, 1951, 35: 725.

The authors investigate the effect of cortisone upon the vascularization which follows corneal burns.

Similar investigations were made by Jones and Meyer (1950) who concluded that cortisone inhibited vascularization after chemical injury to the cornea.

Extensive vascularization, which was remarkably constant in degree, occurred in all but 2 of the controls and was absent in 10 of each of the cortisone groups. Apart from the extent of the vascularization in the majority of all cases, a halo of infiltration surrounded the lesion up to about the tenth day. This was not affected by cortisone; neither did the cortisone affect the rate at which the lesion became smooth and free from staining with fluorescein.

It is concluded that because cortisone inhibits vascularization, after experimental heat burns to the cornea of the rabbit, its use clinically for cases of this type is justified. Although there was no marked difference between the results obtained with subconjunctival injection and those obtained with parenteral injection of the drug, the former method is more advantageous because it has no systemic ill effects. JOSHUA ZUCKERMAN, M.D.

Lint in the Anterior Chamber Following Intraocular Surgery. DERRICK VAIL. *Am. J. Ophth.*, 1951, 34: 1533.

The author presents 3 cases in which lint was present in the anterior chamber of the eyes following cataract surgery. In each case a moderately severe iritis resulted. This is in contrast to the cotton swab fibers that have been found intraocularly following surgery in which no iritis developed. The author suggests that air-borne bacteria entering the eye with the air-borne lint may be the cause.

Steps to eliminate air-borne infection and lint in operating rooms were then discussed. No solution was arrived at, but a plea was made for further study. In the discussion, other cases of foreign matter accidentally inserted in the anterior chamber during surgery were described and precautions were advised. EARL H. MERZ, M.D.

Anticoagulant Therapy in Occlusive Vascular Disease of the Retina. IVAN F. DUFF, HAROLD F. FALLS, and JAMES W. LINMAN. *Arch. Ophth.*, Chic., 1951, 46: 601.

The efficiency as well as the dangers of, and the contraindications to, anticoagulant therapy in occlusive vascular diseases of the retina are reviewed. A survey of the world literature indicates that 109 patients with thrombosis of the central retinal vein were treated with heparin. In 59 per cent the condition appeared to have improved; in 15 per cent it was unchanged, and in 27 per cent it had grown worse; 12 per cent of the patients had glaucoma and 6 per cent of the eyes required enucleation. Of 84 patients with thrombosis of a tributary retinal vein who were treated with heparin, 59 per cent had improved; in 24 per cent the condition was unchanged and in 17 per cent it had grown worse; only 2.3 per cent had glaucoma and only one eye required enucleation. Of 23 patients with thrombosis of the central retinal vein who were treated with bishydroxycoumarin, 70 per cent showed improvement; in 26 per cent the condition was unchanged, and in only 1 had it grown worse; none of the eyes became glaucomatous or required enucleation.

The authors' control series consisted of 140 untreated patients with complete occlusion of the central retinal vein (a total of 148 eyes). In 15 per cent the condition improved; in 35 per cent it was unchanged, and in 49 per cent it was worse; in 43 per cent glaucoma developed. A total of 25 patients with partial venous occlusion were observed from 1 to 12 years. In 54 per cent the condition was unchanged; in 36 per cent it had improved; in only 1 case had it become worse.

Anticoagulant therapy was carried out on 47 patients with occlusive vascular disease of the retina at the University of Michigan Hospital. Four received only heparin; 27 received heparin and bishydroxycoumarin, and the remainder received only bishydroxycoumarin. Prolongation of the clotting time to twice the pretreatment level was regarded as satisfactory with heparin therapy. Twenty to 30 per cent of the normal prothrombin concentration was the therapeutic goal when bishydroxycoumarin was employed. Sixteen of 33 patients (48%) with retinal vein thrombosis improved; the condition of 9 patients (27%) was unchanged and that of 8 (24%) was worse. Of 7 patients with lesions of the retinal arteries, only 2 improved. Of 14 eyes with diabetic retinopathy, 7 demonstrated improvement in visual acuity. A short term of intensive therapy with heparin appeared to produce results as favorable as those observed after prolonged use of bishydroxycoumarin, and the authors recommend heparin for general use. Bishydroxycoumarin induced bleeding in 13 of the 47 patients. Bleeding was sufficiently severe to terminate the therapy in 7 patients and there was 1 associated death. It is emphasized that there must be satisfactory laboratory control when anticoagulant therapy is used.

FRANK W. NEWELL, M.D.

Present Status of Physiotherapy in Ocular Disease. P. D. TREVOR-ROPER. *Brit. J. Ophth.*, 1951, 35: 583.

The various methods of physiotherapy used in ophthalmology are discussed in the light of results in various ocular diseases treated at Moorfields in 1950.

General ultraviolet light was used in only 29 cases and its value was doubtful. Local ultraviolet light treatment, used in only 10 patients, showed little advantage over more convenient types of treatment. Results of iontophoresis with zinc, sulfacetamide, potassium iodide, and calcium were equivocal. Diathermy was of value for the subjective relief of pain, but response was no more rapid than that which normally follows adequate therapy.

The continued use of these methods in modern ophthalmology is debated.

FRANK W. NEWELL, M.D.

The Clinical Value of Cortisone and ACTH in Ocular Disease. SIR STEWART DUKE-ELDER. *Brit. J. Ophth.*, 1951, 35: 637.

The author assesses the clinical value of cortisone and ACTH in ocular diseases. The material is derived partly from the literature and partly from the experiences of a team of investigators in Great Britain.

The dramatic clinical effect of the drugs was first reported in patients suffering from rheumatoid arthritis at the Mayo Clinic. Cortisone may be used to produce these effects, or the pituitary adrenocorticotrophic hormone, ACTH, may be employed to obtain similar clinical responses, by stimulation of the adrenal cortex to elaborate an unusual amount of active steroids.

It is pointed out that cortisone does not affect the cause of any disease process, but merely provides susceptible tissues with a temporary protection, rendering them more resistant to injury and permitting the tissue cells to function normally in an abnormal environment. Cortisone acts as a fire shield (Hench) but does not put out the fire nor does it repair the damage caused by the fire.

Cortisone therapy is peculiarly effective in ophthalmology. It temporarily blocks the exudative phases of inflammation (whether bacterial, anaphylactic, allergic, or traumatic in origin), and it inhibits fibroblastic formation in the stage of tissue repair without in itself influencing the cause of the responsible disease. However, it has no effect on degenerative conditions nor on the organized sequelae of inflammatory disease.

Its merit is enhanced by the safety of local treatment (with drops or ointment), which is indicated in external diseases of the eye; and by drops, ointment, and subconjunctival or intracameral injections in intraocular inflammatory conditions of the anterior segment of the eye. Systemic therapy is indicated in diseases affecting the posterior segment of the eye.

The following conditions respond well to local and systemic administration of cortisone:

Conditions responding to local therapy include acute and subacute iridocyclitis, sympathetic ophthalmitis, infective superficial keratitis, early deep keratitis, syphilitic interstitial keratitis, episcleritis, phlyctenular keratoconjunctivitis, rosacea keratitis, and spring catarrh.

Conditions responding to systemic therapy are acute and subacute generalized uveitis and early focal choroiditis.

The following conditions respond indifferently or irregularly to cortisone: chronic iridocyclitis, chronic choroiditis, chronic uveitis, scleritis, irritation to atropine and other drugs, superficial corneal degenerations, and chemical injuries.

The following conditions do not respond to cortisone therapy: Mooren's ulcer, corneal scars, pemphigus, Stevens-Johnson's syndrome, dystrophic conditions of the cornea, mustard-gas keratitis, Sjogren's syndrome, Coats' disease, central retinal venous thrombosis, periphlebitis retinae (Eales' disease), primary pigmentary degeneration of the retina, pigmentary macular degeneration, primary glaucoma, cataract, optic atrophy, and degenerative conditions.

There was no definite assessment in the following conditions: dendritic herpetic ulcers, superficial punctate keratitis, epidemic keratoconjunctivitis, sclerosing keratitis, central serous retinopathy, exudative macular retinopathy, optic neuritis, retrolental fibroplasia, reticulosis, exophthalmic conditions, and early pathological changes in corneal grafts.

It is concluded that cortisone does not cure any ocular disease but it is of immense advantage, temporarily blocking the acute evidence of inflammatory processes or subacute exudative phenomena and thus preventing the occurrence of damage to the eye, which may be catastrophic. Its action is confined to the time of administration and shortly thereafter, and its use cannot replace specific etiological treatment.

JOSHUA ZUCKERMAN, M.D.

Action of Cortisone on the Tissue Reactions of Inflammation and Repair, with Special Reference to the Eye. SIR STEWART DUKE-ELDER and NORMAN ASHTON. *Brit. J. Ophth.*, 1951, 35: 695.

The effect of cortisone on the tissue reactions of inflammation and repair, with special reference to the eye, is discussed.

The authors review the literature under several headings, viz., capillary permeability; inflammatory exudation; cellular infiltration and the formation of granulation tissue; the formation of connective tissue; new vessel formation; and epithelial and endothelial regeneration.

They report the following tentative conclusions with regard to the action of cortisone on the tissue reactions of inflammation and repair:

1. The increased permeability characteristic of inflammation is significantly lessened.
2. The exudative phenomena associated with inflammation are inhibited.
3. Cellular infiltration and the formation of granulation tissue are inhibited.
4. The fibroblastic activity associated with tissue repair is diminished, with consequent retardation in the healing of wounds, an effect evident in the avascular cornea.
5. Postinflammatory neovascularization is significantly diminished.
6. Epithelial regeneration is not influenced. Endothelial regeneration and repair seem to be retarded.

The mechanism whereby cortisone influences these reactions is probably indirect, through the intervention of some soluble intermediate agent or agents which become available in the living animal.

JOSHUA ZUCKERMAN, M.D.

A Series of Cases Treated Locally by Cortisone. Sir Stewart Duke-Elder, O. M. Duthie, J. Foster, F. W. Law, and Others. *Brit. J. Ophth.*, 1951, 35: 672.

The authors present a series of 416 cases of various types of ophthalmic disease in which local treatment with cortisone was administered, and the results obtained were compared with those which have already appeared in the literature.

In all of these cases, cortisone was administered locally, either by the instillation of drops or by subconjunctival injections. Drops were given usually in a 1 in 4 dilution with the buffered phosphate. The subconjunctival injections consisted of 0.2 to 0.3 ml. of the standard Merck's suspension of cortone acetate, every 3 to 5 days.

It was found that in early cases there may be some improvement in the acute exudative manifestations, but in established cases the medication has no effect.

A summary and an assessment of the results have been given in a preceding paper.

Joshua Zuckerman, M.D.

EAR

Patulous Eustachian Tube. Paul M. Moore and Jack B. Miller. *Arch. Otolar.*, Chic., 1951, 54: 643.

The authors believe that the condition of patulous eustachian tube is much more common than is generally supposed. The symptoms of the disease (due to continuously open eustachian tubes) are roaring in the ears synchronous with the patient's own breathing, and autophony (the patient's own voice sounds harsh and loud to him). The symptoms are made worse by exercise and are improved by sharp, short inspiration while the patient's nose and mouth are closed, and by lying down. On physical examination, the ear, nose, and throat appear to be normal, save for incidental findings.

Diagnostic tests for this condition consist of in-and-out movement of the tympanic membrane with respiration, and Perlman's test in which the ear is auscultated while the air in the nose is gradually compressed by means of a sphygmomanometer attached to the nose by a glass nasal suction tip as the instrument is pumped up. A pressure of 20 mm. of mercury is normally required to open the eustachian tube, as indicated by a loud sound "lub" which the examiner can hear via the auscultation tube.

In the patient with patulous eustachian tubes, the tube may be opened with 2 to 12 millimeters of mercury.

The authors review the history of the literature on patulous eustachian tubes and the various pathologic theories such as generalized emaciation, atrophy of the fat layer of Rudinger around the cartilaginous tube, cicatricial contracture following adenoidectomy, recurrent infections of the adenoids, chronic sinusitis, tuberculosis of the eustachian tube, syphilitic ulceration following retrogasserian neurectomy, and others.

The authors review the various methods of treatment of this condition, and state that insufflation of salycilic acid and boric acid powder in proportions of 1 to 4 through a eustachian catheter is the most satisfactory in their hands. They report and give protocols of 12 cases of this disease.

William K. Wright, M.D.

Preauricular Fistulas (Fistulas preauriculares). Héctor Marino and Jorge Niklison. *Dia méd.*, B. Air., 1951, 23: 3565.

The dearth of reports in the literature regarding this condition and the relative frequency of its mismanagement by the practitioner prompted this article. A review of the embryology is outlined in which the authors emphasize the cutaneous location of these fistulas along the incisura orbicularis to the tragus and along the intermaxillary incisura. They emphasize also that these fistulas may have a pharyngeal origin and be a remnant of the vestigial bronchial cleft, with the possible involvement, therefore, of bone and cartilage. The authors omit stating that the cutaneous openings may be anywhere in the front or side of the neck, including the v-shaped area of the neck. Most frequently they cause no symptoms until they become inflamed following an upper respiratory infection, or begin to suppurate and discharge sebaceous material. Not infrequently they are associated with fibrochondromas and dermoid cysts, or may present as a cyst attached to a fibrous cord, which upon further dissection may reveal another cyst down to cartilage or bone.

Obviously, diagnosis is important and surgical extirpation may be of major proportions; the novice will not infrequently injure branches of the facial nerve, or the hypoglossal nerve. Again eradication to bone or cartilage may be mandatory to avoid recurrence.

The authors employ the Joseph incision paralleling the helix along the tragus to the auricular lobule. This can be extended towards the mastoid, if necessary, or over the temporal bone. Electrocoagulation is routinely employed and drainage with a Penrose drain is advised, as marked edema may develop with unfortunate induration in the operative field. Methylene blue, brilliant green, or radiopaque substances are frequently used to outline the tract, but these may not disclose the full extent of the lesion and meticulous dissection is imperative.

Miguel Drobinsky, M.D.

Contributions of Audiology to Fenestration Surgery. George E. Shambaugh, Jr., and Raymond Carhart. *Arch. Otolar.*, Chic., 1951, 54: 699.

The authors review the origin and definition of audiology. They then describe some of the interesting findings yielded from a combined effort of the Department of Audiology and the Department of Otolaryngology at Northwestern University in the diagnostic hearing clinic.

The method for checking the calibration of the pure tone, air conduction audiometer is described.

When 10 normal adult ears are tested the air conduction thresholds should average within 5 decibels of the 0 line. The best audiometric technique is an ascending threshold with an interrupted tone.

The authors believe that bone-conduction audiograms should be just as accurate as air conduction audiograms. However, the results should always be checked with the tuning fork test. A quiet soundproofed room should be used; adequate, but not excessive, masking is necessary. The unit should be properly calibrated so that the average bone loss for each frequency in a case of pure nerve deafness equals the average loss for air for the same frequency. The calibration correction factor is discovered by testing 10 people with nerve deafness and averaging the differences between air and bone losses for each frequency. This computes a correction factor to be applied at each frequency to the manifest bone level.

The impedance formula is applied to otosclerosis to show that partial stapes fixation increases stiffness and affects the low tones more than the high tones, resulting in a downward tilt of the air-conduction curve. Complete fixation results in an increase in mass which affects the high tones as well as the low tones.

The increase in bone conduction after the fenestration operation described by Juers has now been investigated further. Carhart has shown that pure stapedial ankylosis affects bone conduction to the extent of 5 decibels at 512, 10 decibels at 1,024, 15 decibels at 2,048, and 5 decibels at 4,096. This otosclerotic notch is corrected by a fenestration operation so that bone conduction is normal after surgery. Therefore, in the estimation of the perceptive component of a fenestration candidate, the otosclerotic notch should always be deducted from the corrected bone conduction.

It has been shown by various workers that there is always an air-bone gap of at least 25 decibels following fenestration.

With these two facts it is possible to predict accurately the postfenestration hearing level of a candidate by taking the corrected calibrated bone conduction curve, subtracting the otosclerotic notch, and then adding the postfenestration air-bone gap of 25 decibels. By this formula, it has been possible to predict the postfenestration result in 62 per cent of 75 cases within 3 decibels, and 88 per cent within 9 decibels.

Another test at the Northwestern Hearing Clinic is the speech reception test. This roughly agrees with the average of the pure tone speech frequencies (512, 1,024, 2,048). When the speech frequency average is much more greatly affected than the speech reception, a psychogenic overlay which occasionally occurs in otosclerosis should be suspected and other specific tests for psychogenic deafness are made.

The discrimination test is used to determine the clearness of hearing for difficult sounds and words before and after fenestration and with hearing aids. Hearing aids are tested at their "use setting," which corresponds to the volume setting at which the patient is most comfortable wearing his hearing aid. By these methods it is possible to compare the hearing of an otosclerotic patient wearing a hearing aid before surgery with the hearing of the same patient without a hearing aid after fenestration. Results on a fairly small series of patients have shown that the (A), or ideal fenestration candidate, hears slightly better and just as clearly following fenestration as with a hearing aid, while the (B), or less suitable patient, hears slightly poorer but more clearly after fenestration. The (C), or unsuitable patient, also hears slightly poorer but more clearly after fenestration. In all of the cases the most important factor governing the usefulness of either a hearing aid or fenestration is the amount of nerve degeneration.

The authors describe the mechanics of hearing after fenestration, and the reason for the residual 25 decibel air-bone gap—the lack of the impedance matching mechanism of the ear drum and ossicles. They also emphasize the importance of an adequate air-bone gap of at least 40 decibels for the speech frequencies if any benefit from fenestration is to be expected. Actually, the most grateful patients following fenestration are those with an air-bone gad of 55 to 65 decibels. WILLIAM K. WRIGHT, M.D.

The Influence of the Fenestration Operation of the Labyrinth on the Cochlear Electric Response. TEIICHI KASHIWADO, GENGO IINO, TOSHIO TOKUNAGA, and ITARU OOHASHI. *Yokohama M. Bull.*, 1950, 1: 1.

An experiment to determine the value of the fenestration operation is presented. The tests were based on previous work done by Wever and Bray. These men found that the cochlear electric response was reduced or absent when the conducting apparatus was damaged. It was believed that the cochlear electric response should again return to near normal levels if a fenestration was done following impairment of the conducting mechanism.

The experimental equipment was prepared according to the procedure of Wever and Bray. Guinea pigs and cats were used. The cochlear electric response was tested first in the normal animal, then following destruction of the eardrum, malleus, and incus, and finally after a fenestrum had been made in the basal coil of the cochlea.

The results were more conclusive in the guinea pigs but were significant in the cats. The cochlear microphone response was obtained in the normal animal. Following removal of the eardrum and two ossicles, the response was diminished or absent, but after the fenestration operation it returned and in many cases was increased in amplitude.

JOHN R. LINDSAY, M.D.

Repositioning the Mandible in Cases of Obstructive (Low Tone) Deafness and Tinnitus. S. H. RONKIN. *Arch. Otolar.*, Chic., 1951, 54: 632.

The author discusses, in general, the previous investigational work related to deafness caused by

malocclusion of the temporomandibular joint. In the past, therapy has always consisted of opening the bite, and so much of this has been done that there is now considerable feeling that the procedure is carried out too frequently. There are inadequate diagnostic tests and criteria for determining which cases of deafness will be corrected by therapy along these lines. The author thinks that the proper relationship between the condyle and the mandibular fossa is individual and can never be made to conform to an average face measurement. He also discusses other reasons why he believes that the temporomandibular joint itself plays no part in causing deafness and tinnitus.

He then discusses the anatomical embryological relationships which lead him to believe that it is the relationship of the mandibular musculature to the auditory tube which causes the deafness and tinnitus previously ascribed to malocclusion of the temporomandibular joint.

The author's method of treating this condition is to remedy malposition of the jaw so that the mandibular musculature, particularly the internal pterygoid muscles, will resume their normal positions. He treats all cases of low-tone deafness or tinnitus, or both. The patients are tested by the speech reception method, bite impressions are then made, and the mandible is repositioned to what appears to be normal for that person. Minor readjustments are made each time, followed by the speech test, and the position which brings the maximum hearing improvement is recorded and the patient's jaw is held in this position by splints. The repositioning usually brings an increase of from 10 to 15 decibels in speech reception.

This article presents an interesting new hypothesis upon the subject of deafness due to temporomandibular joint malocclusion. It should be investigated further. WILLIAM K. WRIGHT, M.D.

PHARYNX

Malignant Disease of the Nasopharynx. F. C. ORMEROD. *J. Lar. Otol.*, Lond., 1951, 65: 778.

Nasopharyngeal neoplasms are mainly epithelial in origin, if the lymphoepithelioma is accepted as a carcinoma arising in lymphoid tissue. Squamous cell carcinoma is the commonest type found in the nasopharynx. These tumors usually arise in the vault or lateral wall. The signs and symptoms occurring as a result of them may be local, but more often are otological, ophthalmoneurological, or cervical metastatic.

A mass in the neck is the most common sign. The lymphatic drainage from the nasopharynx is to the upper deep cervical nodes by way of the retropharyngeal glands. Due to decussation, bilateral involvement of the nodes is frequent. The involved nodes are usually found under the mastoid or in the region of the sternocleidomastoid muscle, and between the mastoid process and the angle of the jaw. They may not be firm on palpation.

The nasopharyngeal signs are mainly mechanical. Obstruction of the choanae and interference with the movement of the soft palate occur. Rhinolalia and regurgitation of fluids result. A postnasal drip, often blood-streaked, following ulceration of the mass is a late sign.

Either by primary obstruction or by secondary infection, the eustachian tube may become blocked. There may be a secretory otitis media in some cases, or a suppurative otitis media with perforation of the drum.

The cranial nerves may be involved in this malignant process, either by invasion of the floor of the skull or by spread into the deep neck spaces outside the skull. Nearly all nerve roots may be involved in an invasion of the skull. The second, third, fourth, and sixth nerves may be caught by extension through the foramen lacerum. Similarly, involvement of one or all of the branches of the fifth nerve may occur. Extension further back into the cranial cavity may involve the ninth, tenth, eleventh and twelfth nerves. Extension within the cranial cavity is most common secondary to a squamous cell carcinoma. The last four cranial nerves are usually the ones involved in extracranial extensions, along with the sympathetic chain and phrenic nerve.

Several syndromes are described to denote the results which take place with extension of the malignancy:

Trotter's syndrome describes involvement of the maxillary division of the fifth nerve, the pharyngeal motor fibers of the vagus, and obstruction of the eustachian tube.

Jacob's triad consists of optic atrophy, ophthalmoplegia, and trigeminal neuralgia.

Lannois-Gradenigo's syndrome consists of lateral rectus muscle palsy associated with a trigeminal nerve lesion.

Foix's syndrome, in which the wall of the cavernous sinus is affected, includes paralysis of the third, fourth, and sixth nerves, and also the ophthalmic division of the trigeminal nerve.

The syndrome of the bulbar nerves involving all the last four nerves requires intracranial extension. This is rare.

The syndrome of the jugular foramen consists of paralysis of the ninth, tenth, and twelfth nerves, together with the sympathetic causing a Horner's syndrome.

The syndrome of the peripharyngeal space involves only the ninth and tenth nerves.

The vocal cord-diaphragm syndrome occurs when the lower cervical nerves are involved and can cause injury to the phrenic and recurrent laryngeal nerves.

A course of treatment by which 6,000 to 7,000 roentgens, either by teleradium or deep irradiation, are delivered to the primary growth and 5,000 to 6,000 roentgens are delivered to the cervical nodes offers considerable palliation. Whether permanent freedom from recurrence occurs is a matter for future observation. JOHN R. LINDSAY, M.D.

NECK

The Problem of Simple Goiter. F. F. RUNDLE. *Med. J. Australia*, 1915, 2: 464.

Simple goiter is defined as any visible or palpable enlargement of the thyroid gland. Thyroid enlargement, however, is signified only if the enlargement is well marked, and the goiter is firm, asymmetrical, or nodular.

This enlargement is due to a deficiency of iodine, a tendency for the thyroxine output of the gland to fall, an increased secretion of thyroid-stimulating hormone from the anterior pituitary lobe, and finally, compensatory thyroid hyperplasia. The basic factors in a low iodine intake are (1) distance from the ocean and (2) the character of the soil. A survey is made of the world incidence of simple iodine-deficiency goiter, and importance of the use of iodized salt is stressed. The author states, categorically, that there is no endocrine disease which can be so easily and so surely prevented as simple goiter. All that is necessary is to remember the addition of iodine to the daily diet.

ELY ELLIOTT LAZARUS, M.D.

Biopsy of Lateral Tumors of the Neck: Exploratory Cervicotomy (La biopsie des tumeurs latérales du cou: la cervicotomie exploratrice). HENRI REDON and LE GUÉRINAIS. *Sem. hôp.* Paris, 1951, 27: 3384.

The authors deplore the fact that many biopsies of tumors of the neck cannot be used by pathologists. This is due to the anatomic complexity of the region and to the lack of experience in obtaining such biopsies.

The patient should be hospitalized and sufficient anesthesia, either regional or general, should be employed. Whenever possible, histologic examination should be performed during the operation, because, on the basis of its results, an exploration may be replaced by a curative procedure. Interpretation of aspiration biopsies requires special training. Biopsies should be preceded by a thorough clinical examination and aspiration.

There are two contraindications to biopsy: (1) suspicion of a metastasis of a nevus-carcinoma because it accelerates the spread of the lesion, and (2) suspicion of tuberculous adenopathy because a fistula formation or a secondary infection may result.

The removed tissue should have the following dimensions: 1 cm. long, 0.5 cm. wide, and 3 mm. thick. Local anesthesia is unsatisfactory and should be replaced by regional or general anesthesia.

JOSEPH K. NARAT, M.D.

Increased Intracranial Pressure Following Radical Surgery of the Neck. R. K. JONES. *Arch. Surg.*, 1951, 63: 599.

Radical surgery of the neck, involving removal of one or both internal jugular veins, results in alteration of the venous drainage of the head. A group of 11 patients subjected to such surgery were studied with regard to this alteration in the venous system and its effect on intracranial pressure.

The venous system of the head is briefly discussed with emphasis on the importance of the vertebral venous plexus, as pointed out by Batson. This venous plexus becomes increasingly important when one or both jugular venous systems are absent.

Patients were subjected to the usual physical and laboratory examinations. Intracranial pressures were determined before the operation and at regular intervals after it for up to 12 days. The eye grounds were also examined. The intracranial pressure was increased after operation in all of the patients. The ophthalmoscopic findings were venous engorgement and blurring of the disc edges. The changes were greater and more persistent when both jugular veins were removed. Increased blood pressure, a decreased pulse and respiratory rate, and stupor were also observed in some of these patients.

Various methods of combating these changes were used. Of these methods, the use of the sitting position, protection of the remaining jugular vein from compression, and the intravenous injection of 50 c.c. of 50 per cent glucose solution were the most useful.

DONALD C. GEIST, M.D.

SURGERY OF THE NERVOUS SYSTEM

BRAIN AND ITS COVERINGS; CRANIAL NERVES

Ligation of the Internal Carotid Artery for Aneurysmal Lesions of the Circle of Willis. ROBERT C. BASSETT and H. HARVEY GASS. *J. Am. M. Ass.*, 1951, 147: 842.

The purpose of this report is to present the results of simple ligation of the internal carotid artery in the neck in 17 cases of saccular aneurysms of the circle of Willis and in 5 cases of carotid cavernous sinus aneurysms. A permanent ligation was not performed unless the patient under local anesthesia was able to tolerate occlusion of the internal carotid artery on the operating table for at least 30 minutes, and usually for 1 hour, without more neurologic symptoms.

On admission, 14 of the 17 patients with saccular aneurysms presented symptoms or signs other than those of subarachnoid hemorrhage, including ptosis, diplopia, ocular palsy, bruit, proptosis, facial paresthesias, and ocular or head pain not associated with the recent subarachnoid hemorrhage. The efficacy of treatment was judged on the basis of amelioration of these signs and symptoms. Eleven of the 17 patients with saccular aneurysms and all of the patients with carotid cavernous sinus aneurysms who underwent ligation of the internal carotid artery in the neck showed significant improvement in neighboring symptoms. Two other patients who were asymptomatic but had previously had subarachnoid hemorrhage had no bleeding 6 and 7 months later.

Nine of the patients with saccular aneurysms showed no additional symptoms due to ligation. Four others showed a transient hemiparesis or aphasia which cleared rapidly. In 1 of the remaining 4 patients a pre-existing left hemiparesis was made worse. In a second one a mild left hemisensory syndrome developed 10 days postoperatively, but was scarcely noticeable 6 weeks later. The third patient developed hemiparesis 3 days postoperatively, and the fourth patient, who was 62 years old, became semiconscious on the operating table following a partial occlusion of the vessel, and died 4 days later.

Thus the procedure of ligation was ultimately well tolerated by 15 of the 17 patients with saccular aneurysms and by all of the patients with carotid cavernous sinus aneurysms. The authors believe it is a gratifying procedure when performed for unruptured infraclinoidal aneurysms of the circle of Willis in patients less than 50 years of age and for carotid cavernous sinus aneurysms.

RICHARD C. SCHNEIDER, M.D.

Neurosurgical Methods in the Treatment of Tuberculous Meningitis. SIR HUGH CAIRNS. *Arch. Dis. Childh.*, Lond., 1951, 26: 373.

Streptomycin has been used in 125 cases of tuberculous meningitis in the past few years, and in a high proportion of these cases it has been administered by the intrathecal route. The place of neurosurgical methods in the management of tuberculous meningitis has not yet been clearly defined, but the methods used include all operative procedures, such as cranial exploration by burr holes or craniotomy.

When lumbar puncture has been performed and a careful search of the cerebrospinal fluid for acid-fast bacilli has been unsuccessful in the face of pleocytosis and a rise of protein in the fluid, ventricular estimation and ventriculography may be advisable. In tuberculous meningitis the ventricular cerebrospinal fluid may show tubercle bacilli when none has been found in the lumbar fluid. If spinal block should develop during the use of intrathecal streptomycin, the ventricular route should be used without delay, so that there is never a day's intermission in this therapy. The best approach is injection of the drug through frontal burr holes. In about one-third of the 125 cases the spinal theca became blocked. In order to try and avoid this type of block the position of the patient should be alternated between the prone and supine positions, and, with the patient's head elevated, there should be a daily injection of 5 ml. of air at the conclusion of the daily lumbar puncture. The air rises to the cisterna interpeduncularis, and the injections do not appear harmful.

In most cases of tuberculous meningitis there is a primary rise of intracranial pressure due to obstruction of the subarachnoid space, particularly the cisternae interpeduncularis and ambiens, causing a communicating type of hydrocephalus. Obstruction of the ventricular system either at the aqueduct of Sylvius or the foramen of Magendie is rare. A high intracranial pressure after 3 or 4 months of treatment is usually due to persistent activity of infection rather than to inert fibrous adhesions.

In infants with enlarging heads and adults with papilledema and high lumbar cerebrospinal fluid pressures, attempts have been made to relieve the hydrocephalus by such measures as cerebellar decompression, lateral and third ventriculostomy and short circuits between the ventricular system and the subarachnoid spaces of the cerebral hemispheres. Experience with these operations indicates that they are usually unsuccessful and the best hope of relieving the communicating hydrocephalus is to persist with intrathecal and systemic streptomycin. Continuous ventricular drainage to relieve increased intracranial pressure is dangerous because of the risk of mixed infection. It should not be continued for more than 3 or 4 days.

Three unusual cases of tuberculous meningitis with complications are presented.

It is of the greatest importance during streptomycin therapy that the patient be frequently evaluated from the clinical side and by laboratory studies of

the cerebrospinal fluid. Ventriculography or cerebral angiography should be employed if headaches are unusually severe, if localizing signs occur, or if an unusual course develops under treatment.

RICHARD C. SCHNEIDER, M.D.

Cerebral Angiography in Abscess of the Temporal Lobe. P. H. SCHURR. *Brit. J. Surg.*, 1951, 39: 156.

The author discusses the value and superiority of cerebral arteriography in the diagnosis and treatment of 12 cases of brain abscess of the temporal lobe. Cases of abscesses in other regions of the brain are not included in the report. Angiography revealed the lesion accurately in each case. Other procedures, such as ventriculography or encephalography, are usually not as exact in their localization and obviously are not innocuous. Electroencephalography proved of benefit in only 11 of 17 cases.

The author used the percutaneous procedure, usually under local anesthesia. The anteroposterior view usually revealed the anterior cerebral artery to be shifted to a variable degree to the opposite side, with usually some elevation of the middle cerebral artery. This view, however, was not definite, and the displacement could not be correlated with the size of the abscess. The lateral view, however, always revealed the middle cerebral artery to be elevated in some portion. In the lateral view it was definitely possible to correlate the elevation of the middle cerebral artery with the size of the brain abscess. It is stressed that accurate positioning of the patient is essential because a slight shift of the head or a shift of the x-ray tube will give the appearance of a shift of the middle cerebral artery.

The value of angiography in the differential diagnosis from nonspace-occupying lesions is obvious. It is more difficult to differentiate neoplasms; however, it is frequently possible to note the avascular area in the region of the abscess. It is true that occasionally cystic neoplasms may give a somewhat similar appearance, but even in these cases it is often possible to find some small areas of disturbed circulation. There were no complications attributable to the procedure; therefore, it is believed that repeated angiography can be performed after an interval of a few days without harm.

JACK I. WOOLF, M.D.

Symmetrical Calcifications in the Anterior Limb of the Internal Capsules of the Brain Without Demonstrable Neurological or Metabolic Disturbances. JOEL F. SAMMET and PAUL C. BUCY. *Am. J. Roentg.*, 1951, 66: 880.

The location and etiology of normal and abnormal intracranial calcifications as shown in skull roentgenograms are discussed. Calcification of the basal ganglia alone or in connection with areas of calcification elsewhere in the brain may occur without demonstrable cause and without associated neurological symptoms, or in association with parathyroid insufficiency. Camp and his associates at the Mayo Clinic have assembled 12 cases of symmetrical calcification of the basal ganglia with definite evidence of parathyroid insufficiency and tetany. In 11 instances the parathyroid deficiency was of a spontaneous nature and in 1 case it resulted from a thyroidectomy.

The authors report a case of minor head trauma in which an incidental finding was symmetrical calcification in the region of the anterior limbs of the internal capsule between the caudate nucleus and the putamen. Both clinical and laboratory tests showed no evidence of parathyroid insufficiency. The importance of this type of roentgenographic finding is that it should lead to a thorough investigation of the status of the patient's parathyroid gland.

RICHARD C. SCHNEIDER, M.D.

The Uses of Nuclear Disintegration in the Diagnosis and Treatment of Brain Tumor. WILLIAM H. SWEET. *N. England J. M.*, 1951, 245: 875.

The utilization of isotopes has been of value in aiding in the clinical management of intracranial tumors during the past few years. P^{32} injected intravenously concentrates in neoplastic tissue more than in normal brain tissue in a ratio of 5 to 1 in the slowly growing, sparsely cellular gliomas and as high as 100 to 1 in the more cellular, vascular tumors. The optimal time interval for maximum differential of uptake of P^{32} is from 12 to 48 hours after injection. The introduction of the sensitive 2 mm. Robinson type of Geiger-Mueller counter into the brain then enables adequate demarcation of the limits of the neoplasm to be made by charting of the differential counts.

For assistance in the preoperative diagnosis and localization of intracranial neoplasms, K^{42} has been used because its gamma rays can penetrate the skull. Unfortunately this substance concentrates readily in temporal muscle as well as in the brain tumor, but by placing the counter a short distance from the skull instead of directly upon it this problem is minimized.

A better method for the external localization of brain tumors is being formulated by means of the principle that special types of gamma rays are given off when a positron and electron collide and are annihilated. By use of a coincidence-counting circuit after this annihilation only those pairs of gamma rays that remain unscattered are registered. A suitable position-emmitting isotope is being sought for this purpose at the present time.

Attempts are being made to utilize the energy developed as a result of nuclear disintegration to destroy neoplastic cells. The use of B^{10} may be valuable, for this substance can be adequately concentrated in brain tumors. Since it takes on slow neutrons and then disintegrates, it is suggested that irradiation with these slow neutrons may be effective in treating the neoplasm without significant injury to normal brain.

RICHARD C. SCHNEIDER, M.D.

Fig. 1 (Behrend, Ostertag). Lateral angiogram, phase 1.

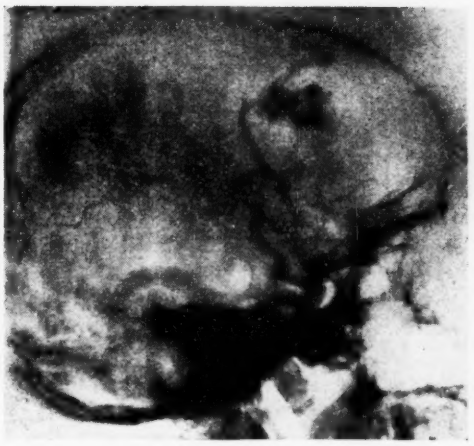

Fig. 2. Lateral angiogram, phase 2.

Contribution to the Question of Cerebral Angiomas (Beitrag zur Frage ueber zerebrale Angiome). C. M. Behrend and B. Ostertag. *Deut. med. Wschr.*, 1951, 76: 1199.

The authors report a case of cerebral angioma and discuss the symptomatology and diagnosis. They emphasize the importance of serial angiography, as single angiograms frequently do not give sufficient information. Several views should be taken during the injection of the contrast material to visualize, if possible, an arterial, an arteriovenous, and a venous phase. This method makes it possible to determine not only the site and size of the angioma but the number and the caliber of the afferent and efferent vessels.

Fig. 3. Angioma in situ.

The symptomatology includes major or minor epileptiform attacks, transitory pareses, and vascular murmurs in auscultation of the skull.

If the location or the extent of the tumor makes extirpation impracticable, x-ray treatment and, in some cases, ligation of the carotid artery has given good results. However, the prognosis is always guarded in these cases. Fatal hemorrhages following an epileptic attack have been recorded.

Surgery should be attempted only if the angioma is not too large, is not located close to the central region, and if the afferent and efferent vessels can be determined by angiography.

A case is reported of a 32-year-old man who for 2 years had suffered from severe headache, and had an apoplectiform episode with transitory hemiplegia and one severe major convulsion. Angiography revealed an angioma of the posterior frontal region with two large afferent vessels which originated from the arteria cerebri media. The angioma was extirpated, and the patient made an uneventful recovery.

Werner M. Solmitz, M.D.

Contribution to the Modern Treatment of Tuberculomas of the Cerebellum (Prilog zuvremenom liječenju tuberkuloma malog Mozga). Nedeljko Popov. *Acta chir.*, Zagreb, 1951, 3: 347.

Four patients operated upon for tuberculoma of the cerebellum since streptomycin became available, in March of 1950, form the basis for this report. The first 2 patients were referred from the military hospital at Zagreb, with the diagnosis of an intracranial

space-reducing process. The ventriculographic findings in the two 23 and 21 year old soldiers showed a symmetrical hydrocephalus of both lateral ventricles, of the third ventricle, and of the upper portion of the aqueduct. The findings were practically identical in both patients and indicated the presence of an expansive factor (tumor) in the posterior cranial fossa, producing an obstructive hydrocephalus.

At operation the 23 year old patient disclosed an arachnoiditis of the posterior cranial fossa which was particularly pronounced over the convexity of the right hemisphere of the cerebellum and about the walls of the cerebellomedullar cistern of that side. The whole of the right hemisphere of the cerebellum was distended by a huge tumor extending towards the floor of the fourth ventricle and towards the pons. Macroscopically, the tumor was a typical tuberculoma. The mass was not completely removed and an ample decompression was done. Despite immediate treatment with streptomycin, a mild form of tuberculous meningitis developed which lasted for about a month.

The 21 year old patient was operated upon the next day. This patient also had a huge tuberculoma of the right cerebellar hemisphere; however, it was situated more superficially and higher, towards the cerebellopontine angle. It could be removed radically. In this patient there did not develop, under postoperative streptomycin treatment, any symptoms of meningitis. Today both of these patients are alive and well; they have put on weight and have no trouble walking.

The third patient to be operated upon in this so-designated "streptomycin era" was a 13 year old boy. Here again the tuberculoma, the size of a large hen's egg, was located in the right cerebellar hemisphere. It was removed in its entirety and under streptomycin postoperative treatment the convalescence was practically uneventful. The patient has put on more than 20 pounds of body weight, and the eyesight, which was largely lost (choked disc), has markedly recovered.

The fourth patient to be operated upon was a 21 year old youth with a medium walnut-sized tuberculoma in the right cerebellar hemisphere. The tumor was located superficially, had penetrated the cerebellar cortex and the arachnoid, and had become attached to the dura of the posterior cranial fossa. It could be completely removed and the field of operation seemed so well evacuated of tumor tissue as to render unnecessary the local application of antibiotics. This saving of streptomycin seemed justified since the convalescence, under intrathecal and intramuscular streptomycin, was without notable consequence. This patient is still in the hospital under observation; however, he seems well, feels well, and shows no tendency to fever, or to recurrence of symptoms.

The author compares these results with those obtained in 11 patients with tuberculoma, some of whom were operated upon and some not, during the period from 1945 to 1950. Treatment had been by the old conservative methods — decompression, incomplete removal, with extirpation in only 4 of the 11 cases. These attempts at total extirpation would naturally involve the less advanced processes, yet, of these, only 1 patient lived longer than 3 years following the operation.

The author prefers the one-stage operation, since it saves streptomycin, is accompanied by a less complicated postoperative course, and the development of streptomycin-resistance by the bacteria present is avoided.

The details of the antibiotic regimen and the author's conclusions are presented in an extensive and excellent abstract, in English, appended to the original text. JOHN W. BRENNAN, M.D.

The Diagnosis of Carcinoma of the Pituitary Gland. ARTHUR B. KING. *Bull. Johns Hopkins Hosp.*, 1951, 89: 339.

The characteristic clinical manifestations of pituitary adenomas include bitemporal defects of the visual fields, primary optic atrophy, headaches, and disturbances of growth and metabolism. An alteration of the sella turcica may be demonstrated on the x-ray examination. Most pituitary neoplasms are benign and spread along the paths of least resistance or expand the sella turcica by pressure erosion. Since the fifth nerve is separated from the pituitary gland by the bony walls of the sella, the cavernous sinus, the carotid artery, and other cranial nerves it is rarely involved in a benign process. However, if the presenting symptom of a patient with a penetrating neoplasm is pain in the face secondary to irritation of the fifth nerve, this may be the typical onset of a carcinomatous process arising in the gland.

A case falling in this category is presented with a discussion of the difficulties arising in the diagnosis and treatment of carcinoma originating in the pituitary gland. RICHARD C. SCHNEIDER, M.D.

The Importance of Careful Differential Diagnosis for the Surgical Treatment of Trigeminal Nerve Neuralgia (Die Bedeutung einer sorgfaeltigen Differntialdiagnose fuer die chirurgische Behandlung der Trigeminus-neuralgie). W. TOENNIS and H. KREISSEL. *Deut. med. Wschr.*, 1951, 76: 1202.

The authors (of the Neurosurgical Department, University of Cologne, Germany) discuss the differential diagnosis of trigemin l neuralgia and the different surgical procedures indicated in this affection. They emphasize the importance of meticulous diagnostic studies and present impressive cases in which uneffective and harmful surgery was performed because of insufficient diagnostic investigation. They warn especially against alcohol injection or electrocoagulation of the gasserian ganglion. Keratitis neuroparalytica with subsequent loss of the eye (43.7% in one series of 87 cases), damage of the cranial nerves, and distressing anesthesia dolorosa occur frequently after this intervention, which should be abandoned altogether.

True idiopathic neuralgia (tic douloureux) is of unknown origin and occurs mostly in the age period between 50 and 60 years. Usually, the attacks start in the area of the second, and sometimes of the third, branch of the nerve. Cases beginning with attacks in the supraorbital branch are practically always symptomatic and should not be considered as idiopathic neuralgia.

Anesthesia dolorosa may occur after surgical interventions such as destruction of the ganglion, or root section according to the method of Spiller-Frazier or that of Dandy. These patients complain of distressing pain and paresthesia of the face, in spite of the loss of sensitivity produced by the operation. Contralateral prefrontal lobotomy gives relief in this condition.

Symptomatic trigeminal neuralgia can be caused by a multitude of various pathologic conditions. The possibility of arachnitis in the occipital area should not be overlooked. Inflammatory processes in the angle between pons and cerebellum may involve the trigeminus and cause neuralgia, especially in the supraorbital branch.

The authors report on a series of 300 patients, 255 of whom underwent surgery. In 177 of these cases, tractotomy (Sjoeqvist method) was performed, in 58 cases temporal section of the root (Spiller-Frazier method), and in 20 cases occipital root section (method of Dandy). The authors summarize that in hypertension and vascular sclerosis temporal root section is indicated, and in isolated neuralgias of the third branch, occipital root section (Dandy method) is indicated. In all other forms of the condition, tractotomy (Sjoeqvist method) is the treatment of choice. WERNER M. SOLMITZ, M.D.

SPINAL CORD AND ITS COVERINGS

The Mechanism of Injury to the Spinal Cord in the Neck Without Damage to the Vertebral Column. A. R. TAYLOR. *J. Bone Surg.*, 1951, 33-B: 543.

The discrepancy between damage to the spinal cord and to the vertebral column in cervical injuries has been the subject of comment by many authors. This communication is concerned with cord damage without any vertebral column injury. The commonly observed anatomical displacement in skeletal injuries of the cervical spine is fracture-dislocation in hyperflexion. Hyperextension injuries are less common. A case report is presented in which the patient suffered forcible hyperextension of the spine with immediate complete areflexic paraplegia. He died 9 weeks after the injury. At postmortem examination there was no fracture-dislocation of the cervical spine and no damage was observed in the disc spaces, joints, or the anterior longitudinal ligaments. The cord, however, had a small softened area in the posterior columns at C_4 and C_5 with less damage to the anterior columns. Two conclusions were drawn: (1) that it is possible for the spinal cord to be damaged by hyperextension of an intact cervical spine; (2) that the cord had been struck from behind.

Roentgenographic studies were undertaken in 5 cadavers in which radiopaque oil had been injected into the cervical spinal canal. Roentgenograms taken in flexion and in the neutral position showed no deformity in the contrast medium. On forced hyperextension a series of indentations appeared on the posterior surface of the column opposite the interlaminar spaces. These defects were believed due to an inward bulging of the interlaminar ligaments. On these studies the thecal outline was narrowed 30 per cent of its total width. The same pattern was confirmed in a patient who was having a lumbar myelogram but in whom the contrast medium was run into the cervical region with the patient in hyperextension.

The segmental level at which cord damage occurs in a cervical injury case is usually at C_5, C_6, or C_7. The contrast studies showed the greatest bulging of the ligamenta flava between C_3 and C_6, so this lesion conforms with the dictum that traumatic vertebral and cord lesions occur at the sites of greatest spinal mobility.

From this evidence it was believed that cases of cervical paraplegia without roentgenographic evidence of bony damage or displacement should be regarded as being due to forcible hyperextension and be treated by immobilization in slight flexion. Traction has no value and should not be employed in these cases.

The authors state that the conception of cord injury by skeletal displacement in hyperflexion with spontaneous recoil to normal relationships is untenable. Treatment of the patients in hyperextension may cause redislocation if the original lesion occurred in extension. If injury was due to projection of the ligamenta flava, hyperextension reforms the projection and compresses the cord.

The article is well documented with excellent roentgenograms. RICHARD C. SCHNEIDER, M.D.

Hemangioma of the Body of a Vertebra with Nerve Compression and Its Surgical Removal (Hémangiome d'un corps vertébral avec compression nerveuse. Exérèse chirurgicale de la tumeur). F. COSTE, G. GUIOT, and R. WEISSENBACH. *Bull. Soc. méd. Paris*, 1951, 67: 1033.

The authors' case is reported as being the first case in the French literature in which a hemangioma of the body of a vertebra was removed. The lesion was at the level of the fourth lumbar vertebra and was approached by hemilaminectomy. The patient complained essentially of sciatica which commenced in November, 1949 and continued until the operation in November, 1950. Roentgenography revealed decalcification of the fourth lumbar vertebra with the typical signs of a hemangioma of the vertebral body. X-ray therapy was delivered to the extent of 2000 roentgen units in sixteen sessions with very little effect on the patient's condition. In November the affected vertebra was approached through a hemilaminectomy and the cord was retracted by means of an extradural approach. The fourth lumbar root

had to be sacrificed to gain satisfactory exposure and following this the vertebral body was entered and curetted out. Only a sense of touch determined the complete removal of the tumor. Histological examination confirmed the x-ray findings. When last seen, in March, 1951, some 5 months later, the patient appeared to be perfectly well.

ADRIEN VER BRUGGHEN, M.D.

PERIPHERAL NERVES

Methods of Treatment of Neuromas of the Hand.
GORDON H. GRANT. *J. Bone Surg.*, 1951, 33-A: 841.

Two major extraneous factors appear to be responsible for the persistence of pain after amputation: (1) the presence of infection with resulting excess scar, and (2) a greater or lesser instability of the psyche of the patient.

It is believed that if correct débridement were applied and the use of modern antibacterial therapy were employed, it would materially reduce the painful sequelae associated with crushing injuries and amputations.

Attempts to salvage skin which is devitalized and doomed to necrosis result in prolonged healing periods during which the skin, terminal arterioles, and the nerve ends become welded to the callus. It is suggested that the resulting anoxia of the neuroma is perhaps one factor in the production of a persistent hypersensitivity to pain.

The mechanism of chronic pain, including its anatomical pathways, is discussed briefly.

Chronic pain rarely follows a primary amputation wherein the nerves are cleanly divided and allowed to fall back into mobile well nourished tissues in which the flaps heal by first intention. Comments are included with reference to the method described by Boldrey in 1943, which consists of burying nerves in the adjacent bone to prevent the formation of neuroma.

Revision of a stump that is tense as a result of badly vascularized skin, is advised. If one adequate revision of the stump with resection of the neuroma fails to cure, further revisions are not indicated.

The technique of repetitious percussion is discussed, and in some of the author's cases this method of repeated percussion of the neuroma has resulted in the relief of pain.

When well conceived local treatment fails to relieve, it is vital to turn without delay to the autonomic nervous system. If sympathetic block fails to relieve, it is useless to carry out sympathectomy. High cordotomy should relieve pain if it is done in time, but procrastination may leave the patient without relief, except through the drastic medium of leucotomy. HOWARD A. BROWN, M.D.

SURGERY OF THE THORAX

CHEST WALL AND BREAST

The Histologic Picture and Prognosis of Cancer of the Breast (Feingewebliches Bild und Prognose des Mammacarcinoms). H. CHIARI. *Langenbeck's Arch. Deut. Zschr. Chir.*, 1951, 269: 247.

While cancer of the breast is found in from 11.2 to 13 per cent of all registered cases of carcinoma in the United States, in Austria it is found in 17.6 per cent of the entire cancer group.

The author reviews 1,600 breast specimens removed surgically, with special attention not only to the grading of carcinomatous cells but also to their relations to the surrounding tissues and to the mode of spread.

Scirrhus was found in 37.6 per cent of the entire group. The tumor was rather small, occupied the upper external quadrant of the breast most frequently, and formed glandular metastases in a large percentage of cases.

Solid medullary carcinoma was registered in 7.0 per cent of the entire group, showed predilection for the upper external quadrant, and formed metastases in the lymph nodes in a large number of cases.

After scirrhus, so-called simple solid carcinoma was the most frequent type, forming 27.5 per cent of the total material. The upper external quadrant was the most frequent site of this tumor.

Duct carcinoma or cribriform carcinoma formed 5.3 per cent of the material. The average age of the patients was somewhat lower than in other groups and the size of the tumor was relatively large; yet the involvement of the lymph nodes was not as frequent as might be expected.

Comedo carcinoma was represented in 1 per cent of all the cases; the tumors were of considerable size and affected mostly elderly women.

Adenocarcinoma formed 7.7 per cent of the entire group; it affected relatively young women, had a long duration, and formed glandular metastases only in one-third of all the cases.

Gelatinous cancer, found in 1.8 per cent of the entire group, gave a relatively good prognosis and occurred mostly in elderly women. The presence of signet ring cells indicated a very bad prognosis.

JOSEPH K. NARAT, M.D.

Occult Carcinoma of the Breast. WILLIAM T. FITTS, JR., and ROBERT C. HORN, JR. *J. Am. M. Ass.*, 1951, 147: 1429.

The preoperative diagnosis of carcinoma of the breast, compared with the final pathological diagnosis, was found correct in only 75 per cent of 166 patients with "dominant lumps" of the breast.

Since occult carcinoma occurs in the breast also, an analysis of 15 patients operated on at the University of Pennsylvania Hospital, Philadelphia, during the last 5 years, for carcinoma of the breast, which manifested itself in some manner before a mass could be palpated in the breast, was made. The presenting signs were as follows:

Discharge from the nipple	4
Dermatitis of the nipple	4
Axillary metastasis	4
Edema of the skin	1
Retraction of the skin	1
Distant metastasis	2
(a) Orbital	1
(b) Abdominal	1

An additional case is reported in which the carcinoma was discovered at autopsy after it had metastasized widely to the abdomen. The primary nodule, 1 cm. in diameter, was in the upper outer quadrant.

The authors believe that any nipple discharge not normally associated with lactation should be investigated surgically even though no breast mass can be palpated. In the 4 such cases the presenting sign was metastasis to the axillary nodes. In 3 of these, the primary lesions were 1 cm., 1.5 cm., and 1 cm. in diameter, respectively. In two, the primary lesions were deep within the breast, but in the third case it was just beneath the areola. In 1 of these 4 cases, despite a large axillary node cancer, no carcinoma was found in the breast after mastectomy. In 4 of the 16 cases, the mammary cancer was bilateral.

Since the first sign of cancer of the breast is not always a palpable mass, the physician should be on the alert for discharge from the nipple, erosion of the nipple, retraction or edema of the skin over the breast, and enlargement of the axillary nodes, any one of which signs may indicate mammary cancer even without a palpable mass in the breast.

FRANK B. QUEEN, M.D.

TRACHEA, LUNGS, AND PLEURA

Bronchography with Di-Iodone (Bronchographie dirigée a la diiodone). J. CHARPIN, H. METRAS, and C. GAILLARD. *Presse méd.*, 1951, 59: 1391.

The authors present a discussion of the value of bronchography for the delineation of pulmonary abscess cavities, to show their exact anatomical location, and for the opportunity of serial examinations to evaluate the progress of therapy.

The obvious limitations of oil-containing radiopaque substances are discussed. The long-standing residual opaque shadows cast by the oily substances make subsequent roentgenologic observation of the pulmonary process exceedingly difficult, if not impossible. This objection is neutralized by the use of water soluble radiopaque substances such as diiodone. Such substances completely disappear from the lung fields within a few hours after their use for bronchography.

ORVILLE F. GRIMES, M.D.

The Bronchial Arteries; Experimental Occlusion. F. HENRY ELLIS, JR., JOHN H. GRINDLAY, and JESSE E. EDWARDS. *Surgery*, 1951, 30: 810.

A study in the dog of the effects of occlusion of the bronchial arterial circulation throughout its entirety by a plastic preparation was undertaken. The animals in these experiments were divided into two groups. Group 1 consisted of those dogs in which the entire right bronchial arterial system was occluded. Group 2 consisted of those animals in which only the bronchial artery of the right apical lobe was occluded.

Mongrel dogs varying in weight from 12 to 21 kgm. were used in this study. Preliminary anatomic studies of the origin and course of the right posterior bronchial artery were carried out.

These experiments were undertaken for the purpose of investigating the importance of the bronchial arterial circulation in the normal dog's lung. Anatomic studies of the origin of the dog's right posterior bronchial artery were made and a method was devised for successfully occluding the bronchial arterial circulation by the injection of vinyl acetate.

In all animals subjected to occlusion of the right posterior bronchial artery, infarction and ulceration of the right stem bronchus and the right lobar bronchi in the hilar region developed. Distal to the hilum the bronchi remained normal. All animals in this group died of bilateral bronchopneumonia. When only the bronchial artery to the right apical lobe was occluded the animals survived, and with one exception no pathologic changes were encountered within the operated lobes. In 1 dog bronchial atresia and bronchiectasis developed secondary to an ulcerative process in the wall of the hilar portion of the right apical lobar bronchus. The bronchial arterial occlusion in this instance was more extensive than in the other animals of this group.

It is apparent from these studies that in the dog, the bronchial arteries are necessary for the nutrition of the main stem bronchi and the lobar bronchi in the region of the hilum. Blood supplied by the pulmonary artery can maintain the integrity of the pulmonary tissue and the bronchial walls distal to the hilar region. Bronchial arterial circulation is not necessary under normal conditions in these latter parts. An explanation is offered for the variable role played by the bronchial arterial circulation in nourishing separate parts of the bronchial tree. This explanation is based on differences in the intrinsic anatomy of the bronchial arteries encountered in these separate locations.

Tracheobronchoesophageal Fistulas (Le fistole tracheo broncoesofagee). GIUSEPPE BENDANDI. *Atti* 11 *Congr. Naz. Chir. Torac.*, Tor., 1951, 1: 7.

In his lengthy collective review of the literature the author covers all phases of tracheobronchoesophageal fistulas. Many illustrations are given.

The fistulas are divided into two separate categories, congenital and acquired. The classifications of Vogt and Ladd are compared and illustrated.

The marked advances in chest surgery are reviewed. Early collaboration between the pediatrician, radiologist, and surgeon is recommended so that the patients may be seen early, operated upon, and followed up by all three. Only in this way can good results be expected from this difficult type of surgery. LUCIAN J. FRONDUTI, M.D.

Arteriovenous Aneurysm, Aorta-Pulmonary (Aneurisma Arterio-venoso, Aorta-Pulmonar). J. M. CABELLO CAMPOS. *An. paul. med. cir.*, 1951, 62: 243.

An interesting vascular anomaly is reported with emphasis on the value of angiocardiography in diagnosis. A mass in the upper mediastinum which was unidentifiable by means of flat x-ray films was demonstrated by angiocardiography to be an aneurysm of the brachyocephalic trunk and an aneurysm of the aortic knob with a fistula in the pulmonary artery. Descriptive roentgenograms and diagrams are included. THOMAS LANE STOKES, M.D.

Pleuroscopy and Intrapleural Severance of Adhesions in Spontaneous Pneumothorax (Pleuroscopia e causticazione intrapleurica delle aderenze nel pneumotorace spontaneo). FRANCESCO SACCO. *Minerva med.*, Tor., 1951, 42: 743.

The subject of spontaneous idiopathic pneumothorax is discussed as to etiology and pathology. It is differentiated from pneumothorax secondary to definite pathological processes. The author proposes that congenital or acquired pleuropulmonary cysts are responsible for the idiopathic variety.

Three case reports are presented. In 2 of these, adhesions were severed with good results. Pleuroscopy was refused by the third patient.

The author believes that pleuroscopy should be resorted to in cases which do not respond to conservative management. He feels that it is not a dangerous procedure and can be of aid in diagnosis. When adhesions are found they should be severed. This acts as a treatment for complications and also prevents future recurrence.

LUCIAN J. FRONDUTI, M.D.

Aspergilloma as the Cause of Bronchiectasis (L'aspergillome bronchectasiant). OLIVIER MONOD, G. PESLE, and SÉGRÉTAIN. *Presse méd.*, 1951, 59: 1557.

The authors apply the term "bronchiectasing aspergilloma" to a special form of pulmonary mycosis, characterized by a voluminous tumor in a dilated portion of the bronchial cavity, which does not penetrate the wall of the bronchus and, contrary to diffuse forms of bronchopulmonary aspergillosis, is well circumscribed.

The tumor causes repeated attacks of hemoptysis and produces a characteristic x-ray image. It is a rare condition, having been observed by the authors only 4 times within 20 years. In 3 cases a segmental resection of the involved portion of the lungs was performed. The authors were able to find reports of 6 cases of aspergilloma in the literature.

The infestation probably takes place through the airways. The formation of cavities is secondary to the growth of fungi. The reaction of adjoining tissues suggests a certain toxicity of the fungi.

Hemoptysis may last from a few hours to a few days, returns at irregular intervals over a period of weeks, months, or years, and is usually moderate. There is no fever, cough, expectoration, dyspnea, anemia, or fatigue. Inasmuch as infectious episodes are never observed, the suspicion is justified that the fungi produce an antibiotic.

As mentioned, the lesion produces a characteristic uniform, round opacity in the roentgenogram. Three-fourths of the circumference of the shadow are surrounded by a crescent-shaped clear zone with outer borders which represent the contour of the bronchiectasis. The surrounding pulmonary parenchyma has a normal aspect. Demonstration of the fungi in the sputum and in the cultures confirms the diagnosis.

Iodides, antibiotics, and irradiation are inefficient. Pneumonotomy produces severe bleeding during and after the operation and exerts no effect on the bronchiectasis. Segmental resection is the operation of choice. JOSEPH K. NARAT, M.D.

The Prognosis of Residual Bronchiectasis after Incomplete Resection. GEORGE P. ROSEMOND, W. EMORY BURNETT, and JOAN HUMPHREY-LONG. *J. Thorac. Surg.*, 1951, 22: 439.

A total of 159 patients operated upon for bronchiectasis have been evaluated from the standpoint of the relief of two symptoms, cough with expectoration and dyspnea. As a result of surgery, 118 patients became free of cough, while in 41 patients cough persisted and varied in severity. In all of the patients in whom cough persisted, residual pulmonary disease was the causative factor. Dyspnea appeared to be related more directly to the degree of infection and the amount of accumulated sputum than to the actual reduction of ventilation. In 23.5 per cent of the cases residual disease was due to faulty evaluation of patients, while in 5.5 per cent the residual disease after operation was deliberate because of the fear of removing too much lung tissue.

It was found impossible to evaluate the extent of bronchiectasis by operative exploration alone. The diagnosis and the operative attack must be made from bronchograms which should be of such clarity as to reveal the segmental bronchi and their alveoli. In cases of bilateral bronchiectasis, lipiodol mapping must be done in stages. To obtain completely satisfactory results all bronchiectatic tissue must be removed. B. G. P. SHAFIROFF, M.D.

Late Complications of Extrapleural Pneumonolysis with Plombage. JOSEPH GOORWITCH. *Dis. Chest.*, 1951, 20: 651.

The author has collected a series of 5 cases in which complications developed following extrapleural pneumonolysis with plombage by either paraffin or oil. Fistula and extrapleural empyema were the most common complications. The fistulas were bronchoextrapleural or extrapleurocutaneous in type; the empyemas were either tuberculous, mixed, or pyogenic. In all cases of this series spontaneous discharge of the plombage material ensued as a late complication irrespective of the existence or absence of empyema. Included in the present series was a case of esophagoextrapleurocutaneous fistula, secondary to extrapleural pneumothorax and oleothorax originally performed in 1942.

Extrapleural pneumonolysis and plombage now have markedly limited indications. The latter may be employed as a temporary procedure in the young when pneumothorax or pneumoperitoneum have failed, when deformity of thoracoplasty must be avoided because of age, and excisional surgery is contraindicated. In the elderly patient it may be employed as a substitute for thoracoplasty when asthma, emphysema, or bilateral tuberculosis contraindicate the latter. The surgeon must bear in mind this late complication of paraffin plombage as an additive risk superimposed on the primary disease. B. G. P. SHAFIROFF, M.D.

Research on Regulating the Residual Cavity Following Pneumonectomy (Indagine sull'assestamento del cavo residuo a pneumonectomia) G. FOJANINI and C. SIMONETTI. *Arch. ital. chir.*, 1951, 74: 361.

The authors report on their observations following pneumonectomy and describe 12 cases. Following are some of the important points brought out:

There is a marked displacement of the mediastinal structures following pneumonectomy. In some cases an air-containing cavity is seen, while in others the operative side is opaque. The latter finding is due to organization of the exudate according to Rienhoff.

Since there is negative pressure in the air-containing cavity, the displacement of mediastinal structures is easily understood. However, with an opaque hemithorax the displacement can be explained only by assuming that the organized exudate is elastic in nature, or else it contains many minute air spaces.

In the majority of cases there is a moderate respiratory deficiency and a moderate to minor degree of sinus arrhythmia.

Phrenic crush is not advisable as diaphragmatic movements aid in the expansion of the remaining lung. Thoracoplasty following pneumonectomy for nontuberculous lesions is not practiced by the authors. LUCIAN J. FRONDUTI, M.D.

HEART AND PERICARDIUM

The Surgical Treatment of Acquired Heart Disease. CHARLES P. BAILEY, MARVIN M. LACY, and JAMES S. C. HARRIS. *Surg. Clin. N. America*, 1951, 31: 1821.

The types of acquired intrinsic heart disease which are amenable to surgery at the present time may be

classified as traumatic, pericardial, valvular, neoplastic, thrombotic, and arteriosclerotic.

Traumatic disease includes contusion and concussion caused by blunt trauma to the chest wall or by blast injury. It usually has no surgical significance unless pericardial effusion develops in a quantity sufficient to justify paracentesis. Bleeding may produce pericardial tamponade some minutes or hours after a stab wound. The treatment of suspected penetrating injuries of the heart is immediate surgical exploration. Associated shock or a poor condition of the patient should not be permitted to delay this definitive surgery, since it cannot be combated until the cardiac bleeding and pericardial tamponade are overcome. Some workers prefer simultaneous diagnostic and therapeutic pericardial aspiration while supportive measures are undertaken. If the symptoms of tamponade are relieved after aspiration, no operation is necessary.

Pericardial surgery may be divided into the treatment of serous or serosanguineous effusions, purulent pericardial effusions, and constrictive pericarditis. Serous effusions have been treated by pericardicentesis. Because it is impossible to empty the pericardial sac completely by this means, dependent surgical pericardial drainage is usually necessary. Purulent pericardial effusions are now treated by antibiotic therapy, and by needle aspirations when necessary. Dependent drainage may also be advisable. Constrictive pericarditis is nearly always the end result of acute pericarditis with appreciable effusion. It is believed to be almost always of tuberculous or pyogenic origin. Surgery consists in the removal of a part of the thickened pericardial wall and of sufficient of the organized exudate to permit adequate release of the ventricles.

The acquired forms of cardiac valvular deformity, which are sufficiently common to justify surgical consideration, are rheumatic tricuspid stenosis, mitral stenosis, aortic stenosis, mitral regurgitation, and aortic regurgitation.

The vast majority of tumors of the heart are metastatic and unsuitable for surgery. Primary tumors of the heart are rare and usually not amenable to surgery. Superficially located tumors may occasionally be excised.

Coronary arteriosclerosis may produce either localized areas of myocardial ischemia or generalized irreversible myocardial damage. The latter cannot be helped surgically. The former can be treated either by grafting vascularized adjacent tissues to the surface of the heart, or by the production or enlargement of existing intercoronary vascular communications by the use of surface (intrapericardial) irritants. Beck has operated on about 50 patients with coronary artery disease, in whom an anastomosis was made between the descending aorta and the coronary sinus by means of a free vein graft. After the function of the anastomosis has been well established, the outlet of the coronary sinus is partially closed off by ligation. Since patients appear to be improved thereby, this method should be used in a large series of cases to determine its place in the treatment of coronary arteriosclerotic disease.

SAMUEL KAHN, M.D.

Surgical Treatment of Congestive Cardiac Insufficiency by Ligature of the Inferior Vena Cava (Tratamiento quirúrgico de la insuficiencia cardíaca congestiva, por ligadura de la cava inferior). J. GIBERT-QUERALTÓ, A. GREGORICH-SERVAT, J. PARAVISINI AND L. ROBERT. *Angiologia*, 1951, 3: 283.

After reviewing the hemodynamics involved, the authors report in detail an interesting case of rheumatic heart disease treated surgically. The patient, a 41-year-old female with mitral and aortic valvular lesions, had functional tricuspid insufficiency, auricular fibrillation, and was decompensated. Medical therapy was unsuccessful. After ligation of the inferior vena cava below the renal veins remarkable progressive improvement was shown through the 11-month follow-up. THOMAS LANE STOKES, M.D.

Observations on the Surgical Treatment of Mitral Stenosis by Commissurotomy. THOMAS J. E. O'NEILL, ROBERT P. GLOVER, and CHARLES P. BAILEY. *J. Am. M. Ass.*, 1951, 147: 1032.

Surgery of mitral stenosis has been responsible for the introduction of the current principles of intracardiac surgery. They have been broadened to include pulmonic and aortic abnormalities as well as septal defects. However, no matter how cleverly the operation is done, if the selection of the patient is an improper one undesirable results may ensue. The author, consequently, stipulates the qualifying criteria conducive to a good prognosis. They are enumerated first as an asymptomatic stage, in which there are no demonstrable symptoms, but a mitral valve deformity which gives rise to a mitral diastolic murmur in a nonhandicapped patient is present. This type of patient is in no need of operation and the stage is significant only because it may progress at some future date.

The second type shows mild or even severe symptoms which are incapacitating and stationary despite the fact that at times a precipitated sudden death may occur. Operative treatment is definitely indicated here because of a low mortality rate and a high degree of restoration.

The third stage represents progressive incapacitation with superimposed complications. Some of the patients may have passed the optimum time for operation but, as a rule, they constitute favorable candidates for surgery.

The next stage represents total debilitation in which the patient's life is practically useless and drugs are of slight, if any, benefit in controlling the complications. Commissurotomy may benefit some patients by slightly prolonging life. The mortality rate, however, is high and it is impossible to foretell the risk prior to surgery.

The last stage is an irretrievable one—hopeless, degenerative, and complex, in which surgery has little to offer.

In 214 patients in whom commissurotomy had been performed, the results showed an encouraging total operable survival rate of 89.8 per cent and only 13 per cent of the patients were classified as having received no benefit.

STEPHEN A. ZIEMAN, M.D.

Chronic Cardiac Compression (Chronic Constrictive Pericarditis). A Critical Study of 61 Operated Cases with Follow-up. J. R. CHAMBLISS, E. J. JARUSZEWSKI, B. L. BROFMAN, J. F. MARTIN, and H. FEIL. *Circulation*, 1951, 4: 816.

Sixty-one cases of pericardiectomies for chronic cardiac compression (the largest series in the literature) are reported. The operative mortality was 18 per cent. Satisfactory results were obtained in 72.1 per cent.

The most common etiologic factor was tuberculosis (28.2%). In 35 cases (57.7%), the cause was classified as unknown. With antibiotic therapy there is increasingly less risk in operating upon patients with active infection and the compression syndrome. The literature indicates that about 65 per cent of the results in the patients operated on by 51 different surgeons were satisfactory.

In this study, the ages of the patients ranged from 6 to 54 years with an average of 37.1 years. The average duration of the primary complaint was 2.5 years. Dyspnea was the most common symptom, and was present in 88.5 per cent of these patients.

Twelve kinds of surgical difficulty occurred in 69 operations on 61 patients. There were 4 deaths. The surgical complications were: hemorrhage from the right ventricle incision in 3 cases, hemorrhage from the left auricle in 2, ventricular fibrillation in 2, cardiac arrest in 1 case, bilateral pneumothorax in 1, hemorrhage from the coronary artery in 2 cases, and tear of the coronary vein in 1 case. Postoperatively, 11 patients (18%) died in the hospital. There were varying causes for the deaths.

Six patients required more than one operation. One was operated on three times, 1 four times, and 1 five times. Three patients were operated on twice each.

With an operative mortality of 18 per cent and satisfactory results in 72.1 per cent, the value of pericardiectomy in selected cases appears to be established.

FRANK B. QUEEN, M.D.

Experimental Procedures for Entry into the Left Heart to Expose the Mitral Valve. GEORGE H. A. CLOWES, JR. *Ann. Surg.*, 1951, 134: 957.

A simple experimental technique is described which permits entry into the left heart through the auricle for exposure of the mitral valve. A dry field is obtained by diverting oxygenated blood from the left pulmonary veins into a pump which injects it into the systemic arterial tree through an iliac artery. A clamp is temporarily placed on the right pulmonary artery to prevent blood from passing through that lung to the auricle. While the left side of the heart is not functioning, a normal cardiac output with adequate blood pressure is maintained by the pump. Normal oxygenation of blood occurs under these conditions. Postoperative deaths from emboli, a frequent complication in the early experiments, have been almost entirely eliminated by confining the actual cardiotomy to the auricle. Experiments on ventricular cardiotomy indicated that thrombi are likely to form after slight trauma to the ventricular endocardium.

Of 6 dogs in which the mitral orifice, and, through it, the left ventricular cavity were exposed for periods of 10 to 15 minutes, 1 died of sepsis; the other 5 fully recovered. The usefulness of the procedure was demonstrated by the creation of a chronic mitral stenosis in 24 dogs by partially approximating the valve leaflets with sutures.

JONAS BRACHFELD, M.D.

"Myxoma" of the Heart. Report of a Case in Which Death Occurred as a Result of Detachment of the Tumor from Its Pedicle. T. B. BREWIN. *Guy's Hosp. Rep.*, Lond., 1951, 100: 278.

The presence of a gelatinous polyp in the left atrium of the heart is an unusual pathologic condition. The etiology of this lesion is controversial. Some regard it as a myxomatous type of neoplasm, others regard it as a cardiac embolus. While more than 200 such cases have been reported, the diagnosis has never been made during life. It is now believed that recent advances in cardiac surgery should make myxoma of the heart amenable to operative treatment.

The author reports the case of a 42 year old man who collapsed suddenly while at work. He complained of pain in the back and paralysis of the lower extremities. Both legs were cold and reflexes were absent. A tentative diagnosis of herniated intervertebral disc was made. A systolic and presystolic murmur was heard over the apex. Shortly afterward the right leg became discolored and the patient died. It was noted that at no time in the past had there been any evidence of rheumatic disease and that the patient had served in an A one capacity as a soldier during World War II.

At autopsy, the lower end of the aorta was found closed by an embolus which extended to the renal vessels and caused severe infarctions of the kidneys and spleen. At the margin of the fossa ovalis in the left atrium, a spur of tissue was located from which the embolus originated. Histologic examination showed the embolic mass to be covered by a single layer of flat endothelium containing a myxomatous tissue with eosinophilic cells.

It is suggested that electrocardiographic evidence of atrial and right ventricular strain without a positive clinical explanation might be indicative of a tumor of the right atrium. Angiocardiography might be considered as a diagnostic procedure. When evidence points to such a condition an exploratory thoracotomy must be regarded as justifiable.

B. G. P. SHAFIROFF, M.D.

Surgical Treatment of Wide Patent Ductus Arteriosus. PHILIP SANDBLOM and GUNNAR EKSTRÖM. *Acta chir. scand.*, 1951, 102: 167.

As a rule, patent ductus arteriosus is readily recognized. The continuous murmur over the pulmonary artery is sufficient for the experienced examiner to make the diagnosis immediately. However, there are a few special instances of patent ductus arteriosus which give atypical signs and symptoms. In these patients cardiac incompensation is obvious, the heart is enlarged, and physical development is retarded; the continuous murmur is substituted by a long systolic murmur, sometimes followed by an early, short diastolic murmur. In these cases the diagnosis can be made only with the aid of such diagnostic methods as catheterization of the heart, possibly also catheterization of the actual ductus arteriosus, angiocardiography, and thoracic aortography. In the atypical cases the pressure in the pulmonary artery is increased severely.

Anatomically, also, these cases differ from the usual type of patent ductus arteriosus. The ductus is extremely wide and often very short. The pulmonary artery is frequently substantially distended and thin-walled. Central to the ductus the aorta is likewise very wide. Surgical treatment of this group is, therefore, difficult.

Of 98 cases of patent ductus arteriosus treated surgically at the Kronprinsessan Lovisas Children's Hospital, Stockholm, from 1946 through 1950, 91 were typical and 7 atypical. The case histories of the 7 patients in the atypical group and operative notes on each are recorded.

Three operative deaths occurred among the 7 atypical patients as compared with 1 death among the 91 typical patients operated upon.

In the first 2 cases the ductus was doubly ligated. In these 2 cases, since the ductus was so short and wide, the two ligatures lay close together and, therefore, the risk of recurrence was thought to be great. However, re-examination 2 years and 1.5 years, respectively, after the operations showed good late results. In the 5 remaining cases the ductus was divided, in 2 cases successfully with satisfactory results. In the 4 successfully treated patients the general condition improved remarkably.

The authors draw the following conclusions:

1. The posterior aspect of the ductus should perhaps be freed preferably from the aortic convexity, the distal part of the aortic arch being lifted and the posterior wall of the ductus being freed, under visual control.

2. Double ligation is less risky and should, therefore, always be taken into consideration.

3. A hard clamp is sometimes sufficient to cause a rupture even though it be applied and manipulated with extreme care.

4. Extremely wide patent ductus arteriosus should probably be regarded as inoperable when the patient has severe pulmonary hypertension.

5. The surgical treatment of very wide patent ductus arteriosus should preferably be done before the child develops severe pulmonary hypertension, and if possible before the age of 5 years.

JACOB T. BRADSHER, JR., M.D.

Double Aortic Arch. GUNNAR EKSTRÖM and PHILIP SANDBLOM. *Acta. chir. scand.*, 1951, 102: 183.

The embryonic development of the large vessels is complicated and, therefore, the number of anatomic anomalies is great. Originally, these large vessels appear as symmetrical pairs. The two primitive ascending aortas continue via symmetrical aortic arches into two descending primitive aortas. Each of these continues into its own umbilical artery. Between the primitive ventral and dorsal aortas, six pairs of branchial arch arteries are laid down. The two descending (dorsal) aortas do not approach one another before the abdominal region, where they fuse at a very early prenatal stage. By the fourth prenatal week the fusion reaches the umbilical artery. The fusion continues also in a cranial direction. The proximal parts of the originally ascending (ventral) aortas fuse to form a single midline trunk, the truncus arteriosus. Also, the six pairs of branchial arches undergo marked modification. The fourth left arch persists as the definitive aortic arch. The pulmonary arteries develop from the sixth pair. The internal carotid arteries are derived from the third arch arteries and the cranial portions of the primitive dorsal aortas. Of the aortic arches, the first, second, and fifth retrogress as do also those parts of the primitive dorsal aortas between the third and fourth arch arteries bilaterally, as well as that part on the right between the fourth arch arteries and the descending aorta. The normal involution and changing process of aortic arches and the primitive aortas may sometimes stop prematurely, or the changes may be excessive, such as in coarctation of the aorta.

The double aortic arch is a result of the persistence of the fourth right arch artery, which normally involutes. The two aortic arches usually pass around the trachea and esophagus to unite again dorsal to the esophagus, slightly to the left or to the right of the midline at the level of the third or fourth thoracic vertebra. The single descending aorta then usually continues to the left of the midline down to the hiatus aorticus. Many variations of this may occur and fusion of the aortic arches may not occur, each arch continuing into its own iliac artery.

The authors give an account of 2 of their own cases of double aortic arch operated upon at the Kronprinsessan Lovisas Children's Hospital, Stockholm, and analyzed 83 verified cases from the literature.

Stridulous, audible respiration was the dominating symptom in these cases. Many of the patients had a harsh cough and a hoarse voice. There seemed to be a marked tendency toward prolonged infections of the respiratory tract. Occasionally, tracheal compression caused cyanosis. Feeding often accentuated the respiratory trouble, and difficulty in swallowing was a prominent symptom.

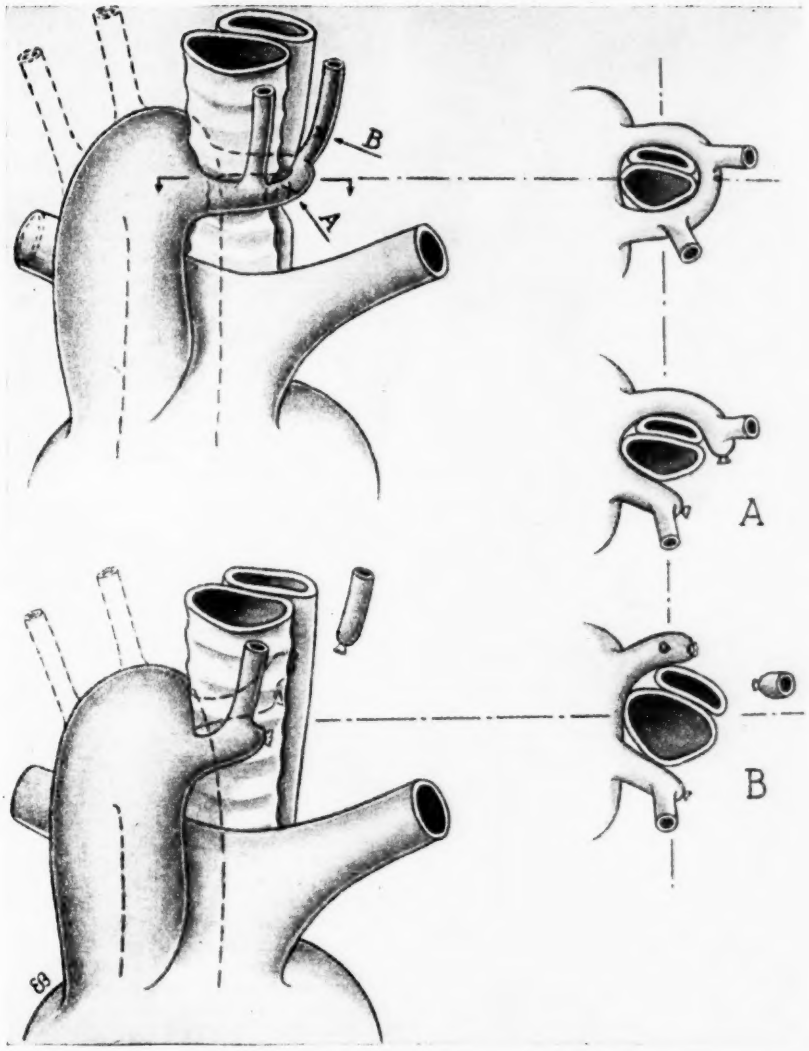

Fig. 1 (Ekström, Sandblom). Drawing made at operation of Case 1. Both arches are equally thick. The ligamentum arteriosum was divided. The left arch was divided and sutured by the method of Gross (probable, but not anatomically verified, details are given in broken lines).

Stridor and dysphagia in the newborn suggest vascular anomalies, and are indications for x-ray study. If the roentgenogram shows a transverse, usually semicircular, anterior bulge of the esophagus at the level of the third or fourth thoracic vertebra and a narrowing of the trachea from behind and from both sides at the same level, a diagnosis of double aortic arch is justified.

A left thoracotomy with subperiosteal resection of the fourth or fifth rib seems the preferable approach to the double aortic arch in most instances. If, however, preoperative roentgen examination of the esophagus should show a left aortic knob, and if there is at the same time a thick retroesophageal vessel, a right thoracotomy is to be preferred. It is, of course, preferable to divide the smaller arch,

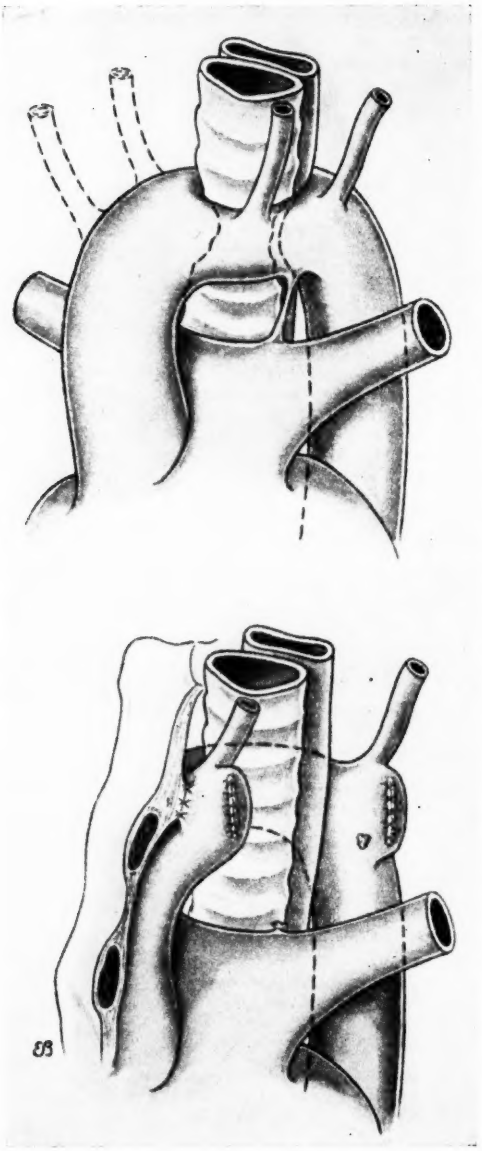

Fig. 2 (Ekström, Sandblom). Drawing made at operation in Case 2. The left arch is much narrower than the right. It was first divided between double ligatures. Not until after the left subclavian artery had also been divided did the posterior part of the left arch slip to the right behind the esophagus so that the vascular ring opened.

and in the presence of a thick left arch and left descending aorta, the dissection of a narrow, right posterior arch from the left half of the thorax is so difficult that the correct anatomic relations may be missed at operation. Since it is important to divide the ligamentum arteriosum and there is a persistent ductus arteriosus in 12 per cent of the double aortic arches, one ought, in principle, to choose left thoracotomy as the method of approach.

A double aortic arch with symptoms of compression of the trachea indicates operation. If the symptoms are severe, operation should not be postponed because infants with severe symptoms of compression who are not operated on generally die within the first 7 months of life. In the absence of compression, operation is not indicated.

The two accompanying drawings indicate the authors' findings and surgical handling of their 2 cases. JACOB T. BRADSHER, JR., M.D.

Metastatic Carcinoma of the Pericardium (Pericarditis carcinomatosa metastasica). OSVALDO FUSTINONI AND ALBINO M. PEROSIO. *Prensa méd. argent.*, 1951, 38: 2771.

At present there is no diagnostic means of establishing with certainty the presence of pericardial metastasis. The authors' patient, age 51, presented symptoms (primarily cardiac tamponade with marked dyspnea, cyanosis, and precordial pain) which were preceded 8 months by a productive cough with 1 instance of hemoptysis. Since the patient was an inveterate smoker he obtained relief upon cessation of smoking, only to be aggravated by resumption of the habit. The hemoptysis caused the patient to be hospitalized.

Roentgenograms taken at monthly intervals showed a marked degree of pericardial effusion. Repeated tappings yielded up to 1,000 c.c. of a hemorrhagic fluid which was negative bacteriologically. No cellular study was reported. An electrocardiogram taken early in the illness showed an elevated S-T segment in the standard and chest leads with biphasic T waves. This is typical of the tracing in early pericarditis. Later, the S-T segment became isoelectric with inversion of the T waves, which is typical of pericarditis in the later stages. The patient developed phlebitis of the left leg and died of cardiac tamponade while considerations for pericardotomy were being entertained. Autopsy disclosed adenocarcinoma of the prostate with metastasis to the pericardium and tracheobronchial lymph nodes.

At no time did this patient exhibit urinary symptoms, nor were reports of carcinomatous induration of the prostate indicated in the physical examination. This may often be the case, although, typically, the marblelike hardness of the posterior prostate may be appreciated rectally. However, carcinoma of the prostate may originate in any of the lobes, and be demonstrated cystoscopically by an unyielding, firm bladder neck and whiteness of the tissue involved.

This patient would have benefited greatly from early pericardotomy, which would have given symptomatic relief and established the diagnosis. An anterior rectus approach with a drain left in place from 4 to 6 days would have given adequate alleviation. No estrogenic therapy was attempted.

MIGUEL DROBINSKY, M.D.

ESOPHAGUS AND MEDIASTINUM

Cytologic Diagnosis of Tumors of the Esophagus (Citodiagnosis dei tumori dell' esofago). V. PRICOLO, T. BAGLIONI, G. AMISANO. *Tumori*, Milano, 1951, 37: 401.

Cytologic diagnosis to-day is recognized as a very important method to diagnose malignant tumors of the uterus, stomach, rectum, sigmoid, and of the genitourinary apparatus. Seybolt, Papanicolaou, and Cooper have used it and have obtained positive results in the diagnosis of malignant tumors of the esophagus. With this method Anderson, McDonald, and Olsen obtained correct results in 24 carcinomas of the esophagus and in 26 carcinomas of the cardia, while biopsy demonstrated a negative result in 8 cases.

The great advance in surgery of the esophagus requires an early positive diagnosis of the tumor. Cytologic diagnosis is the answer to it because it is easy to carry out and is devoid of the risk of perforation and emphysema which may complicate instrumental biopsy, especially when the tumor is of the infiltrative type. In addition, cytologic diagnosis does not require clear vision as does diagnosis by means of biopsy.

The technique employed by the authors consists of esophagoscopy. The esophagoscopical tube contains a flexible steel wire of the Chevalier-Jackson type, threaded at the end for a distance of 2 or 3 inches. This part is covered with gauze, secured with cotton, and under clear vision is brought in contact with the esophageal lesion and passed over it a few times in a spiral, backward and forward. In order to obtain sufficient tumor material this procedure is repeated three or four times, a different piece of gauze being used each time.

This method has been used with splendid results by Terracol and Guibert, and with it some French authors have been able to remove pieces of the neoplastic tissue.

This cytologic study for the diagnosis of esophageal tumors revealed:

1. A general increase in the volume of the nuclei and of the cytoplasm.
2. Polydimensions of all the elements.
3. A dimensional increase of the nucleus.
4. Polymorphism.
5. Hyperchromia, always evident in the nucleus.
6. Basophilia of the cytoplasm, with the May Gruenwald method.
7. The appearance and numerical increase of nucleoli which frequently have irregular shapes.
8. The presence of free nucleoli.

In the 20 cases examined by the authors in which the material for study was removed according to their method, the following was observed:

1. Normal epithelial cells obtained from normal control subjects and from patients with neoplasia do not reveal any deviation from the normal.
2. Neoplastic cells, because of their morphological difference, attract the attention of the examiner.
3. Morphological, dimensional, and chromatogenous modifications lead to the diagnosis.
4. A constant resemblance of the neoplastic cells is found in all cases observed.

JOSEPH M. A. PAPE, M.D.

The Present Status of Surgery of Cancer of the Thoracic Esophagus and Its Possibilities (Position actuelle et possibilités de la chirurgie du cancer de l'oesophage thoracique). P. SANTY and P. MICHAUD. *Arch. mal. app. digest.*, Par., 1951, 40: 932.

An analysis of 327 cases of cancer of the esophagus is offered by the authors.

In 179 cases an operation was performed. If the lesion is longer than 6 cm. its extirpation carries a very great risk and, therefore, instead of attempting to remove such extensive tumors, the authors recommend a palliative operation, namely, anastomosis above the lesion. Such a procedure was employed in 105 patients, while in the remaining 74 a radical resection was performed.

Tumors in the lower third of the esophagus were operated on via the left thoracic approach. The postoperative mortality after resection in this group of 54 cases was 31.1 per cent. The relatively large number of short survivals suggested that in many instances a simple anastomosis should have been done in preference to resection because the latter, if not sufficiently radical, may accelerate the progress of the disease. A palliative operation in 79 cases carried a postoperative mortality of 21 per cent. This high figure was due to the fact that even in poor risks anastomosis was performed instead of gastrostomy, because it offers the patient greater comfort.

The thoracoabdominal approach was used in tumors of the middle third of the esophagus. The authors prefer to open the chest on the right side to avoid the aorta. The postoperative mortality after resection of 15 tumors reached 60 per cent. The early recurrences and short survival periods created doubt as to the proper indications for resection of tumors in this location. The mortality after 26 palliative operations was 50 per cent.

Of 5 patients with cancer in the upper third of the esophagus, 2 survived the operation. One was in perfect health 9 months later while the other had metastasis in one of the glands of the neck 15 months after the operation.

The authors conclude that great restraint is advisable in deciding upon the indications for resection of the esophagus and that a palliative anastomosis should be considered more frequently.

JOSEPH K. NARAT, M.D.

MISCELLANEOUS

Parasternal Diaphragmatic Hernia (Ueber die parasternale Zwergfellhernie). MARIE LUESCHER. *Langenbecks Arch. Deut. Zschr. Chir.*, 1951, 269: 183.

Parasternal hernia lies in Larrey's space between the sternal and the costal portion of the diaphragm, at the height of the seventh rib and more frequently on the right than on the left side because the left space is better protected by the heart with its pericardium.

The author was able to collect from the literature only 17 cases of parasternal hernias, and she reports 1 case of rupture of the right side in a girl, 12 years of age, who was admitted with complaints of pressure sensation in the right side of her chest. Roentgenograms revealed a hernia containing the transverse colon.

Because of the danger of incarceration, an operation was performed. The hernia was repaired through an upper midline abdominal incision. The hernial ring was oval and the xiphoid process was absent; hence the assumption that the ring was formed by the confluence of both Larrey's spaces was justified.

Parasternal hernia may be of congenital or acquired origin. The condition is found most frequently in patients from 60 to 80 years of age.

JOSEPH K. NARAT, M.D.

Variations in Postoperative Proteinemia in Thoracic Surgery (Variazioni protidemiche postoperatorie in chirurgia toracica). G. ILLING and G. MONTI. *Arch. ital. chir.*, 1951, 74: 316.

The authors studied the blood protein levels in patients who had been operated on for chest conditions. Daily determinations were made, and only in a few cases was this determination made every second day.

The authors concluded that the variations were diversified in nature. The most frequent observation was a lowering of the total protein for the first few days. This was due mainly to a lowering of the albumen fraction, which resulted in a diminished albumen-globulin ratio. When there were no complications the preoperative level was re-established in a period of from 5 to 15 days; when complications were present the protein level was ultimately lowered.

In certain cases there was a disproportionate drop as compared to the operative trauma. This was believed to occur in patients with a hypoprotein tissue level, even though they had a normal blood level. In these cases which may be considered to represent a compensated protein state it is of utmost importance to have accurate postoperative control in order to administer large quantities of proteins either by mouth or parenterally.

LUCIAN J. FRONDUTI, M.D.

SURGERY OF THE ABDOMEN

ABDOMINAL WALL AND PERITONEUM

Desmoid Tumor of the Anterior Abdominal Wall (Tumor desmoide da parede anterior do abdome). JAIRO POMBO DO AMARAL. *Rev. brasil. cirurg.*, 1951, 22: 11.

This rather comprehensive dissertation on desmoid tumors was occasioned by a case history study of a 49-year-old negro female who presented a large tumor of the anterior abdominal wall measuring 34 by 29 by 22 cm. and weighing 4,800 gm. It had been present for 10 years and had suddenly grown from a very insignificant mass. It was discrete, freely movable laterally, and occupied the greater part of the entire anterior abdominal wall from the xiphoid to the right iliac crest. Gynecologic examination revealed a concomitant large fibroid uteri.

Both tumors were removed, the one pathologically consistent with a true desmoid and the other, a fibromyoma. Desmoid tumors of the size and with the location of the present one are considered rare, and the usual lack of clinical symptoms makes diagnosis difficult and ultimately dependent on histopathologic studies.

The postoperative course in this instance was rough and rugged, the patient developing brachial paralysis, acute gastric dilatation, and paralytic ileus. However, although recovery was delayed, it was complete. STEPHEN A. ZIEMAN, M.D.

The Use of Skin Grafting in Hernial Repair. J. C. BELL ALLEN. *Med. J. Australia*, 1951, 2: 502.

Repair of the large direct hernia and of the recurrent hernia presents a very difficult problem in so far as devising a means of reconstituting the deficient posterior wall. The direct hernia is the result of a congenital weakness of the transversalis fascia, either as a whole or in part. On many occasions this weak fascia is taxed beyond its capacity by increasing abdominal pressure produced by intra-abdominal fat. To the recurrent hernia are added surgical trauma, tissue destruction, and a weak scar.

In the effecting of an adequate repair considerable skill and ingenuity are required to locate and utilize available tissues. Mechanical aids, such as metal filigree and silk lacing, have not had universal success or approval. The use of fascial grafts, particularly fascia lata, has been followed by a high recurrence rate.

The cases were divided into several groups: (1) primary direct hernias, (a) unilateral and (b) bilateral, (2) recurrent hernias with the same subdivisions, (3) sliding hernias and (4) incisional hernias.

The importance of restoring the inguinal canal to a state as close as possible to the normal would appear essential. The posterior wall should consist of a tense fascial layer occupying the interval between the lower border of the internal oblique and transversus muscles above, and the inguinal ligament below. The anterior wall should be reinforced in such a way that the opening of the external ring is small and situated low in the canal, when possible in front of the body of the pubis, only sufficient space being allowed for the egress of the cord structures without compression. In the majority of cases it should be possible to carry out this type of reconstruction by utilizing for the posterior wall the existing transversalis fascia which forms the outer covering of the direct sac, or by skin grafting. For the anterior wall either resuture should be carried out, if the external oblique fascia is of sufficiently good quality, or, alternatively, a combination of this resuture with a rectus sheath flap.

CHARLES BARON, M.D.

A 4.5 Year Analysis of Tantalum Gauze Used in the Repair of Ventral Hernia. W. J. FLYNN, A. E. BRANT, and G. G. NELSON. *Ann. Surg.*, 1951, 134: 1027.

The results of the use of tantalum gauze in 45 patients followed up from 8 to 55 months are reported. Most of the patients had large incisional hernias; in addition, 2 were epigastric, 2 umbilical, and 2 ventral (nonpostoperative).

In 2 patients moderate postoperative pain was a complication for several months. In one patient, the pain was relieved by the removal of the tantalum and in the other, it subsided after the injection of 1 per cent novocain.

A collection of serum was noted in 5 wounds, 3 of which were grossly infected. All eventually healed satisfactorily.

In 1 patient, recurrent herniation occurred 18 months after the implant. The recurrence was not through the tantalum gauze but above it.

Roentgenographic examination of these wounds shows that the gauze becomes fragmented as early as 3 months postoperatively; however, this does not interfere with the success of the operation.

The authors conclude that tantalum gauze is a useful adjunct in the repair of large hernias.

FREDERICK W. PRESTON, M.D.

GASTROINTESTINAL TRACT

Gastric Diverticula in Infancy. GLORIA L. OGUR and ALBERT J. KOLARSICK. *J. Pediat.*, S. Louis, 1951, 39: 723.

Two interesting case reports of diverticulum of the stomach in infancy are presented.

The first case was that of a male infant with a tensely distended abdomen 48 hours after birth. The child survived for a period of 3 days. Autopsy revealed a purulent peritonitis due to a large saccular diverticulum of the cardiac region of the stomach, which had ruptured through a gangrenous area

There was evidence of intussusception through a thick band near the upper end of the stomach.

The second case was that of a 1½ month old female infant who, in addition to a congenital hypertrophic pyloric stenosis, had a diverticulum in the lesser curvature of the antrum of the stomach. Only the stenosis was corrected by a Ramstedt procedure. The diverticulum was not removed.

HAROLD LAUFMAN, M.D.

Value of Gastric Biopsy in the Study of Chronic Gastritis and Pernicious Anemia. IAN J. WOOD. *Brit. M. J.*, 1951, 2: 823.

Biopsy of the gastric mucosa is done through a flexible gastric tube consisting of a length of Bowden wire covered with plastic tubing to render it airtight. At the distal end is a metal cylinder housing a cylindrical knife which can be moved up and down past a lateral hole by means of a wire which passes through the whole length of the instrument. Suction is exerted at the upper end of the tube and this sucks in a knuckle of gastric mucosa through the lateral hole at the lower end. This knuckle of gastric mucosa is then cut off by pulling up the knife. A fragment of mucosa 2 mm. in diameter and extending down to the muscularis mucosae is obtained. Most frequently, the fragment is removed from the greater curvature of the body of the stomach, the complications are few, and complete healing occurs in 8 days.

The author reports his observation of several patients with lesions representative of the three groups of diffuse gastric lesions, from a histologic point of view. These are classified as superficial gastritis, atrophic gastritis, and gastric atrophy. Superficial gastritis may lead to recurrent bleeding and appears to be associated with chronic flatulent dyspepsia which waxes and wanes, and is often influenced by worry, malnutrition, or alcoholism. This may resolve, especially if the causal factor is removed. It is associated with hypochlorhydria or achlorhydria. If it resolves there is improvement in the patient's symptoms, in the level of the free acid, and in the biopsy picture. It may progress to atrophic gastritis, with persistent achlorhydria and perhaps more pronounced symptoms.

In atrophic gastritis there is atrophy of the acid and pepsin-secreting cells in addition to the inflammatory reaction. This may cause recurrent flatulent dyspepsia, atrophy of the tongue, constant hypochlorhydria or, more often, achlorhydria, and be negative to a barium meal test. There may be hypochromic anemia, due in part to blood loss to the mucosa, malnutrition, and impaired intestinal absorption of iron. There appears to be little or no evidence that pernicious anemia or subacute combined degeneration of the cord occurs in this group. This shows little or no tendency to heal. Severe gastric atrophy without inflammatory changes is associated with pernicious anemia and/or subacute combined degeneration of the cord, and is probably not the end stage of chronic gastritis. It may well be a slow atrophic process of different etiology. In pernicious anemia there is severe atrophy of the gastric mucosa with a tendency to intestinal metaplasia, there is a complete or almost complete absence of the inflammatory changes seen in superficial gastritis and atrophic gastritis, the mucosa shows no tendency to degenerate when given standard liver therapy over a period of years, and the mucosa does not regenerate when given liberal injections of vitamin B_{12}.

Atrophic gastritis can be produced artificially by applying deep x-ray therapy to the gastric mucosa. These findings, however, disappear and become normal after a period of time.

LEROY J. KLEINSASSER, M.D.

Gastric Tuberculosis. A Case Report of Tuberculous Perigastric Adenitis with Invasion of the Gastric Wall and Perforation of Its Lumen (Tuberculose gástrica. A proposito de um caso de adenite bacilosa de um gânglio perigástrico com invasão da parede gástrica e perfuração para o seu lume). ANTÓNIO GONÇALO DE SOUSA DIAS. *Gaz. méd. Port.*, 1951, 4: 579.

The author reports the interesting case of a 27-year-old woman who showed normal roentgen findings of the lungs and a lesion which was suspected of being a prepyloric gastric ulcer. Following gastrectomy it was found that she had a rare case of tuberculous adenitis of a perigastric lymph node.

WILLIAM E. RICKETTS, M.D.

Treatment of the Hemorrhages Due to Gastroduodenal Ulcers. (Tratamiento de las hemorragias de las ulceras gástricas y duodenales). GUSTAVO MATURANA BARAHONA. *Dia méd.*, B. Air., 1951, 23: 3615.

The author discusses the medical as well as the surgical treatment of gastroduodenal hemorrhage. The main difficulty is to know the cause of the bleeding, which may vary from a ruptured large artery to a superficial erosion of a small vessel. The advantages of early subtotal gastrectomy are emphasized, particularly because this procedure carries only a 2 per cent mortality in experienced hands.

WILLIAM E. RICKETTS, M.D.

Associated Perforation and Hemorrhage in Peptic Ulcers. Treatment by Immediate Gastrectomy. N. S. SLATER. *Brit. M. J.*, 1951, 2: 1257.

An axiom states, "Bleeding peptic ulcers do not perforate, and perforated ulcers do not bleed;" however, the author cites 3 cases in his experience in which hemorrhage and perforation occurred concomitantly. In 2 cases there was a perforated ulcer on the anterosuperior aspect of the first part of the duodenum and free blood in the peritoneal cavity from a second ulcer. In both cases a second duodenal ulcer had eroded the right gastric artery. The third case showed a perforated duodenal ulcer in the anterolateral position and the stomach contained three other ulcers, one of which had eroded the left gastric artery. All 3 patients were treated by sub-

total gastric resection following correction of the immediate shock. The results were excellent in the first 2. The last patient died from a lower nephron nephrosis.

Gordon-Taylor classified perforation and hemorrhage from peptic ulcer in a single patient into three groups: (1) hemorrhage and perforation occurring concomitantly, (2) hemorrhage following a recently treated perforation, and (3) perforation occurring after hemorrhage. Patients of the first group who are treated promptly usually have a low mortality rate, whereas those in the second two groups have a high mortality rate. When perforation complicates a bleeding ulcer, surgery is indicated, but frequently the patient is not in suitable condition for any form of surgery. The diagnosis of perforation in the exsanguinated patient is difficult.

The quoted incidence of concomitant perforation and hemorrhage varied from 1 to 13 per cent in the reviewed literature. However, in most reviews of peptic ulceration complicated by perforation, 20 per cent of the cases gave a previous history of bleeding.

FREDERICK C. HOEBEL, M.D.

Two Cases of Mediogastric Stenosis of Ulcerative Origin. Remarkable Efficiency of Palliative Operation (Sur deux cas de sténose médio-gastrique d'origine ulcéreuse remarquable efficacité de l'opération simplement palliative). MARCEL ROUX, CHARLES DEBRAY, and RAYMOND DUPUY. *Sem. hôp. Paris*, 1951, 27: 3388.

A woman, aged 70 years, was admitted to the hospital in an alarming general condition. She had a stricture of the midportion of the stomach caused by an old ulcerative lesion. A long-loop gastroenterostomy relieved the condition. A follow-up 3 years later showed a well functioning anastomosis.

A woman 60 years of age had a condition similar to that of the first patient and an enormous niche on the lesser curvature above the stenosis. In view of the poor condition of this patient a plastic operation was performed by the incision of the major curvature and suture in the transverse direction. A follow-up 3 months later showed the patient to be in excellent condition.

The authors believe that when a radical operation cannot be performed, a plastic operation is preferable to gastroenterostomy. JOSEPH K. NARAT, M.D.

Surgical Treatment of Gastric and Duodenal Ulcer. M. BJØRNEBOE, H. FABER, O. MIKKELSEN, and E. TOBIASSEN. *Acta med. scand.*, 1951, 141: 16.

Late results in 219 patients with peptic ulcer who were operated on during the period from 1942 to 1945 at the Municipal Hospital of Copenhagen are presented. The series does not include cases of acute perforated ulcer. Partial gastrectomy was performed in 189 patients and gastroenterostomy in 30. The operative mortality of the two methods was, respectively, 5.8 per cent and 3.3 per cent. The 207 discharged patients were followed up from 3 to 7 years after operation; information was procured from 202 patients (98 per cent). Of the patients subjected to gastrectomy, 86 per cent were in good health. The remaining 14 per cent included groups termed unfit for work, periodically unfit for work, and a group which required re-operation. Two types of gastrectomy were performed, the Billroth I and the Polya. Less desirable results were obtained with the Billroth I operation; 14 of the 22 patients subjected to this type of operative procedure showed poor follow-up results. Of the surviving 24 patients who were subjected to gastroenterostomy, 83.3 per cent were in good health at the time of follow-up examination.

Late x-ray examination was made of 137 patients, and gastric ulcers were found in 3. One ulcer was at the site of the operation after Billroth I gastrectomy and 2 others were situated in the gastric stump. During the 3-year to 7-year period of observation, none of the patients died of ulcer disease.

The percentage of recovery in the gastrectomy group was compared to that of a similar series of ulcer patients subjected to medical treatment in a Copenhagen hospital. Of the medically treated series, 29 per cent were found to have recovered after a follow-up period of from 5 to 12 years and 36 per cent were benefited, as compared to 86 per cent recovery in the gastrectomy series. CURTIS ARTZ, M.D.

Primary Partial Gastrectomy for Perforated Ulcer. J. F. NUBOER. *Lancet*, Lond., 1951, 261: 952.

Since 1940, 131 patients with perforated peptic ulcer have been treated by primary partial gastrectomy at the Utrecht University Hospital in Holland. There were 124 males and 7 females ranging in age from 17 to 71 years. Duodenal ulcer was present in 110 patients, ulcer of the lesser curvature of the stomach in 12 patients, and pyloric ulcer in 9 patients. The operation was performed within 9 hours of the perforation in nearly every instance. The operative technique, in every instance, was the Polya modification of the Billroth II operation without drainage.

The mortality rate was 3.8 per cent; 3 patients died of peritonitis, 1 patient died from the anesthetic, and another died as the result of a technical injury to the bile and pancreatic ducts. It is pointed out that the 3 patients who died of peritonitis were operated on before penicillin was available. Among the last 62 patients there has been only 1 death, a mortality of 1.6 per cent.

A follow-up examination of 189 patients was made more than a year later. Twenty patients experienced slight discomfort after eating, but they were able to follow their normal occupations. In 1 patient there was recurrence of an ulcer on the lesser curvature, and further surgical treatment was necessary. It is pointed out that the mortality after partial gastrectomy is lower than that obtained with simple suture of the perforation or with conservative treatment, and since the late results surpassed those obtained with the other two methods, partial gastrectomy is advised as standard treatment for perforated peptic ulcer. CURTIS ARTZ, M.D.

The Late Results of Gastric Resection for Gastroduodenal Ulcer. A. DRABLÖS, V. LINDÉN, and P. SKJELBRED. *Acta med. scand.*, 1951, 140: 327.

This is a follow-up study of patients with ulcer, who had undergone resection of the stomach at Haukeland Hospital during the 10 year period from 1937 to 1946. Of a total of 492 patients treated, 313 were re-examined by means of personal interviews, hemoglobin determinations, and erythrocyte counts. In most of the cases a Billroth II operation was carried out with retrocolic gastrojejunoanastomosis. Fourteen patients died subsequent to the operation (2.8 per cent). An additional 22 patients died of unknown causes. The average observation period was 7.3 years, and the shortest was 3 years.

The causes of death of 30 patients were ascertained 6 months to 4 years after gastric resection for peptic ulcer. Three deaths were due to gastrointestinal hemorrhage, one-half year, 1 year, and 4 years, respectively, after operation. Three patients died of complications following gastrocolic fistula—1, 3, and 4 years, respectively, after the operation. One patient died from stenosis at the seat of anastomosis, 3 years after operation. Altogether, 7 patients died of their gastric disease or of postoperative complications.

Of the 313 patients who were re-examined, 278 were males and 35 were females, a ratio of approximately 8 to 1. The serious complications following peptic ulcer or gastric resection among the 313 patients included 9 cases of gastrointestinal hemorrhage, 2 cases of ileus, 1 case of ulcer relapse, and 1 case of jejunal ulcer with a gastrocolic fistula. One of the re-examined patients was found to have developed gastric carcinoma. With the exception of one woman suffering from a gastrointestinal hemorrhage, all of the complications occurred in men. Including the fatal cases, the total number of cases of gastrointestinal hemorrhage after resection was 12, or 3.5 per cent.

Among the 278 men, there were 12 (4.3%) who complained of severe dyspepsia, the distress being much the same as it had been before the operation. Twenty-five patients suffered from moderately severe dyspepsia, while 86 (30.9%) had a slight dyspepsia which did not have an appreciable effect on their mode of life. The corresponding figures for the 35 women were 6 (17%), 2 (5.7%), and 9 (25.7%), respectively.

Hypoglycemic symptoms occurred in 3.2 per cent, and postcibal symptoms in 4.5 per cent of the patients. Anemia was demonstrable in 26.6 per cent of the men and in 41.2 per cent of the women. None of the patients showed demonstrable pernicious anemia. Among the 313 patients there were 10 men (3.2%) with marked nervous symptoms and 36 (11.5%) with less marked nervous ailments. The corresponding figures for women were 9 (25.7%) and 12 (34.3%). Complete subjective freedom from symptoms was found in 46.6 per cent.

The early mortality, late mortality, and serious postoperative ailments together constituted approximately 20 per cent of the total number of cases, whereas satisfactory results were achieved in about 80 per cent. Resection for perforating ulcer was performed in 96 cases, with 4 deaths (4.2%) due to operation. There was a late mortality of 2 per cent and this was due to peptic ulcer or to complications subsequent to the operation.

LEROY J. KLEINSASSER, M.D.

Gastric Neuroma. (Schwannoma Gastrico). HÉCTOR CARDEZA. *Bol. Soc. cir. Uruguay*, 1951, 21: 399.

Gastric neuromas among the benign tumors of the stomach can present diverse clinical manifestations, depending on size, location, ulceration, and associated gastritis. The author presents in detail a report of a case characterized by repeated episodes of postprandial epigastric distress, radiating to both hypochondria and retrosternally, and aggravated selectively by certain foods. Concomitantly, there were many instances of melena, various bouts with hematemesis, exertional dyspnea, vertigo, and lassitude. At one time, the patient required seventeen consecutive transfusions to combat hemorrhage. Milk, prunes, and puddings caused no distress. The patient was 45 years old, a para 12, and had had 2 self-induced abortions. Examination of the gastric contents disclosed achlorhydria even upon histamine administration. Cholecystography was negative, as was the barium enema, and the initial stomach examination was reported as negative by the radiologist.

Because of persistent melena and hematemesis, and intractable anemia in spite of antianemic therapy, a repeat roentgenologic investigation was demanded. With the patient in the decubitus position (prone) and the administration of a small amount of thin barium mixture, a large ulcerating filling defect was seen in the midportion of the stomach, surrounded by an area of edema. Gastric resection involving the greater and lesser omentum followed by gastrojejunostomy was done.

The pathologic report revealed an ulcerating neuroma dissecting the parietal walls of the stomach but comprising no lymph nodes. The association of gastric neuromas with gastritis has been reported often enough to indicate an inflammatory origin of these tumors. As a rule, the symptoms they cause are predominantly hemorrhagic, and their silence is altered by associated ulceration, gastritis, or intraduodenal intussusception.

MIGUEL DROBINSKY, M.D.

Simple Gastric Ulcer and Carcinoma. B. F. SWYNNERTON and S. C. TRUELOVE. *Brit. M. J.*, 1951, 2: 1243.

This is a study of 375 cases of gastric carcinoma treated at the Radcliffe Infirmary. It is another bit of evidence in the controversy over whether carcinoma of the stomach may or may not develop from chronic peptic ulcer of the stomach. Early opinions favored the belief that benign ulcer preceded malignancy in a high percentage of cases. For example, Wilson and McCarty (1909) concluded that 71 per

cent of the carcinomas arose in this manner, and Moynihan (1906) in England stated that about 60 per cent of the gastric carcinomas gave a history suggesting previous simple ulcer. This view is held, but in moderation, by more recent authors. Ewing (1918) concluded that not more than 5 per cent of simple ulcers underwent malignant change, and similar views were put forward by Dible (1924), Cabot and Adie (1925), Stewart (1929, 1931), and Newcomb (1932). By contrast, Brown (1930) studied the fate of 1,130 patients in whom there was definite evidence of chronic gastric or duodenal ulcer and who were treated medically. Of the 77 patients with chronic gastric ulcer only 1 subsequently developed a gastric carcinoma, and that at a different site from the original ulcer. Of the remaining 1,053 patients with duodenal or combined duodenal and gastric ulcer, 9 subsequently developed gastric carcinoma. He, therefore, concluded that chronic gastric ulcer is not a predisposing cause of carcinoma.

Of the 375 cases of carcinoma of the stomach in this study, 26 were singled out because they gave some evidence of pre-existing chronic ulcer in which the carcinoma might have originated. All of the latter cases but 2 had pathological evidence, as recorded by competent pathologists, in favor of their being "ulcer-cancers." On the clinical side, only 13 of the patients had clinical histories which we can accept as probably indicating the presence of a chronic ulcer. Of the 26 patients, no fewer than 18 had prepyloric lesions, the remaining 8 having lesions in the body of the stomach. This distribution corresponds with the distribution of the site of the carcinoma in the remaining 375 patients. It contrasts sharply with the well known predilection for the body of the stomach shown by chronic gastric ulcer.

Among the 18 patients with prepyloric carcinoma, 3 had separate chronic gastric ulcers on the lesser curvature.

In 26 suspected of previous chronic ulcer the incidence of normal acidity or hyperacidity was 57.1 per cent, in the remainder (375) it was 22.2 per cent.

The author believes that in the 26 cases suspected of chronic ulcer it was impossible to state that the carcinoma did not originate in the chronic peptic ulcer. However, in most of them the site of the lesion was that common to carcinoma and not to ulcer. There were two pieces of evidence to support the possibility that the carcinoma may have been unrelated to the preceding peptic ulcer. The first was that half of the patients had clinical histories compatible with the diagnosis of carcinoma of the stomach arising *de novo*, and the second was that 3 of the patients had chronic ulcers distant from the carcinoma. One patient also had pernicious anemia, in which condition peptic ulcer does not occur.

Although some workers believe that normal acidity or hyperacidity such as occurred in 57 per cent of the cases favors the idea of carcinoma development in an ulcer, the author poses the alternate possibility that the presence of free acid may greatly enhance the possibility of ulceration in a gastric carcinoma.

Only two alternate explanations for the data can exist: namely, (a) that chronic peptic ulcers of the prepyloric region are extremely liable to become malignant; and (b) that the prepyloric carcinomas frequently undergo peptic ulceration and may then present with the histological features of the so-called "ulcer-cancer." Although the author finds himself in the predicament of one trying to decide whether the egg or the hen comes first, he favored "b" and decided that the practical outcome of it all was the fact that prepyloric ulcers are commonly malignant and should be resected. FREDERICK C. HOEBEL, M.D.

Cancer of the Cardiac End of the Stomach (Tratamiento del cáncer de cardias). PUIG-SUREDA. *Arg. pat.*, 1951; 22: 167.

Perhaps in no other surgical procedure is the precept "Maximal operation for minimal lesion" more appliable than in that for cancer of the stomach. It is only when the metastases are apparent and widespread that the condition should be considered inoperable. In cancer of the cardia anything short of total gastrectomy is inadequate, which means section of the esophagus above the diaphragm.

A number of devices have been suggested in the past to unite the esophagus with the stomach. In the Torek operation this is accomplished by means of a tube connection between the cervical esophagus and a gastric or duodenal fistula. This procedure was modified by Zaaijer, who connected the thoracic esophagus with a tube through an external fistula in the axilla; the tube terminated in the stomach, and lay outside of the body. Despite appearances, these procedures have been lifesaving. Kirschner, on the other hand, was probably the first to attach the stomach directly to the cervical esophagus, permitting the former to lie within the thorax.

Today's method of uniting the proximal jejunum to the esophagus is commonly used. In removal of the cardiac portion of the stomach care must be taken to remove the lymphatics which are distributed about the splenic artery; the spleen is sacrificed at the time of the gastrectomy and all the lymphatic elements about the lesser curvature and the vessels feeding that area are removed. At times it may be necessary to sacrifice the tip of the pancreas. The author prefers a thoracoabdominal approach for removing the stomach and facilitating the subsequent anastomosis. After the removal of the esophagus a predetermined area on the jejunum is delivered into the thorax and anastomosed to the esophagus.

The author maintains that in some instances it may be necessary to remove the left lobe of the liver, pancreas, and colon, otherwise the operation may be considered only palliative. On the other hand, in certain favorable cases a segmental gastrectomy with ganglionectomy may suffice. Three approaches to the operation are advocated: abdominal, thoracodiaphragmatic, and thoracoabdominal. It is believed that the latter gives the best exposure and materially affects the operation. It is concluded that the

success of the operation depends on good exposure, good anesthesia, appropriate suture material applied without tension, and little or no operative trauma. The conclusion is based on the experience with 40 cases. STEPHEN A. ZIEMAN, M.D.

The Problem of Gastric Cancer Corrected by Practical Surgery (El problema del cáncer gástrico en la prática diaria del cirujano). GARCIA BARÓN. *Arq. pat.*, 1951, 22: 216.

This is an analysis of factors contributing to the operability of cancer of the stomach. It is based on 770 cases which are divided into two groups, the one extending from 1930 to 1943 and the other from 1944 to 1949. In the first group 43 patients had inoperable tumors and 38 deaths occurred. In the second group as the years progressed the number of operations increased from 51 to 73. In 1948, 11 per cent of these cases were diagnosed as cancer of the stomach. No deaths occurred which might have been attributed to the surgery.

Regarding the gastroduodenal ulcers, excluding perforation during the years from 1944 to 1949, 99 per cent of the patients were subjected to an exclusion operation with a mortality rate of 2.06 per cent. Of the last 100 radical resections, 99 were performed according to the Billroth I procedure. The other resection was performed according to the Reichel-Polya method.

The history of the illness of these patients presented the usual symptoms of stomach disorder with eructation, pains, burning, and other similar symptoms. Most of the patients had been on a medical regimen and the diagnosis had been confirmed in the majority of them by roentgenologic studies.

It is believed that resection is the answer to the ulcer as well as the cancer problem, and that such procedures as gastroenterostomy should be limited to the cases in which the cancer is believed to be inoperable on exploratory laparotomy.

STEPHEN A. ZIEMAN, M.D.

Intestinal Obstruction in Children. A. E. DESA and R. A. IRANI. *Ind. J. Surg.*, 1951, 13: 185.

Intestinal obstruction constitutes 4 per cent of the total surgical admissions of children at the Bai Jerbai Wadia Hospital, Bombay, India. Forty-two cases of imperforate anus are included in this series which consists of 5 types of obstruction: (1) stenosis of either the rectum or the anal canal although the passage is patent throughout (14%), (2) failure of the anal membrane to rupture, with a diaphragm between the anus and rectum which are otherwise normal (9.5%), (3) no development of the anus, with the rectum ending blindly as a pouch some distance above the skin level (50%), (4) a patent anal canal, but a blind end of the rectum, which is separated from the anal pouch by a variable distance (5%); (5) two types of fistula; no anal opening with the rectum ending in the bladder, perineum, or urethra in males, or the vagina in females; and a normal anal opening in addition to a fistulous tract from the lower end of the rectum to the various other pelvic organs.

There were 7 cases of congenital intestinal atresia and stenosis. It is believed that an arrest in development during the second or third month of fetal life leads to atresia or stenosis.

There was 1 case of incomplete rotation of the intestine with obstruction. Obstruction in this type of case may be due to pressure of the cecum upon the duodenum, or obstruction of the duodenum by a peritoneal band stretching from the cecum to the posterolateral abdominal wall. Obstruction may also occur when the mesentery of the cecum has poor fixation to the posterior abdominal wall, which allows a twist on the axis of the superior mesenteric vessels. Also a peritoneal band may extend across the duodenum from the incompletely rotated cecum, and thus cause a herniation of midgut with volvulus.

There were 14 cases of acute intussusception. The most common type was the ileocolic in which the apex consisted of small bowel. The next most common type was the ileocecal type in which the ileocecal valve formed the apex of the intussusception.

External hernial strangulation occurred in 4 cases, of which 3 were of the inguinal type and 1 case was of the umbilical type. The sole cause of internal strangulation in 7 cases was the formation of intraperitoneal bands following tuberculous infection of the abdomen.

Round worm obstruction was a common cause of obstruction after the age of 3 years. This type of case may actually be complicated by perforation.

Several examples of each of these types are discussed in detail with regard to diagnosis and treatment. Results in the cases of imperforate anus carried an over-all operative mortality of nearly 25 per cent. In the cases of atresia of the intestine there were no survivors.

Of 13 patients with primary intussusception, 4 expired and in 1 the intussusception was reduced by hydrostatic means. Of 5 patients with recurrent intussusception, 4 were operated upon. Of these, 2 died. The parents of the fifth patient refused operation and the patient died. In the series with obstruction due to ascariasis, 7 patients were cured by anthelmintics alone, 1 patient died from perforative peritonitis after the administration of an anthelmintic and another was cured with atropine, suction, and parenteral saline. Of the 5 patients operated upon, 2 died. There were 3 other patients who died soon after admission, before any treatment could be given.

The authors made a note of 1 case of congenital neurogenic ileus, which they claim should be distinguished from idiopathic megacolon. This patient began vomiting 5 hours after birth, and distention of the abdomen developed 18 hours later with visible coils of intestine. Conservative measures could not control the distention. No surgery was performed and the child succumbed in 6 weeks.

HAROLD LAUFMAN, M.D.

Sympathetic Block for the Preservation of Strangulated Intestines. HELMUTH NATHAN. *Gaz. méd. Port.*, 1951, 4: 571.

The author shows that improvement following intestinal strangulation can be obtained by release of the constriction. Additional blocking of the sympathetic system appears to be a helpful procedure. It can be done by injecting the celiac ganglion, by perivascular injection, or by novocaine infiltration of the tissue surrounding the damaged intestine. This will release the spasm of the vessels.

Five cases successfully managed by blocking of the sympathetic system are reported by the author. These were: (1) a strangulated hernia of Treitz with peritonitis treated without resection, (2) a strangulated intestinal loop with fibropurulent peritonitis in a baby 6 weeks old who had an episode of cardiac arrest during the operation, (3) a strangulated hernia of Treitz for which resection had to be performed, (4) intestinal obstruction with peritonitis following a gangrenous hernia of the Richter-Littre type, and (5) strangulation in a case of volvulus with severe shock. WILLIAM E. RICKETTS, M.D.

Anatomosurgical Study of the Possibility of Elevating a Loop of Small Intestine in Front of the Chest (Étude anatomo-chirurgicale des possibilités d'ascension d'une anse grêle au-devant du thorax). F. VILLEMIN, R. DUFOUR, RIGAUD, and H. CABANIÉ. *Sem. hôp. Paris*, 1951, 27: 3375.

The possibility of raising a jejunal loop in esophagoplastic operations depends on 4 factors: (1) the morphologic type of the patient, (2) the peritoneal arrangement, (3) the vascular conditions, and (4) general factors.

Obviously, the height of the chest and the insertion and direction of the root of the mesocolon are important factors in reconstruction of the esophagus.

The width of the mesentery or the distance between its parietal root and the gut is another important factor. The root has a nearly horizontal direction in short individuals and approaches a vertical direction in tall persons. Above and to the left of the entry of the superior mesenteric artery into the mesentery there is a triangle between the left aspect of the mesentery and the parietal peritoneum. Elimination of this triangle augments the height of the juxtaduodenal segment of the mesentery. On the whole, the peritoneal arrangement is of secondary importance.

The arrangement of the blood vessels is the determining factor. Two types of origin of the jejunal branches from the superior mesenteric artery may be distinguished: in the "stepladder" type the branches are numerous, of small caliber, and they originate at regular intervals from the main arterial trunk, while in the "bouquet" type the number of branches is smaller, the branches are larger, and they are close to one another at the junction with the main trunk, from where they diverge rapidly. Only this last type is favorable to transposition of the jejunum upward.

As to the general factors, the blood pressure must be sufficient to supply blood to the elevated intestinal loop, and the blood must be of good quality, especially in regard to protein contents.

The authors are opposed to the utilization of an intestinal segment in antiperistaltic direction.

The segment of jejunum with an artery which promises the best vascularization because of its length, diameter, and development of arcades, should be selected for transposition. Sectioning of avascular areas of the mesentery in the radial direction facilitates elevation of the intestinal segment. Infiltration of the superior mesenteric plexus with novocaine creates hyperemia and thus prevents necrosis. Antecolic placement of the loop is not advised because the weight of the colon may produce angulation. The retrocolic loop may be placed either in front of, or behind the stomach. Resection of the xiphoid process diminishes angulation.

JOSEPH K. NARAT, M.D.

The Pathogenesis of Mechanical Ileus (Zur Pathogenese des mechanischen Ileus). H. FUSS. *Langenbeck's Arch. Deut. Zschr. Chir.*, 1951, 269: 150.

The author attempted to verify the statement that the frequency of ileus is gradually increasing. He collected 2,013 cases observed in 7 hospitals in the city of Duisburg during the period from 1935 to 1949. In spite of a decrease in the population the number of cases of ileus was higher during the war and the immediate postwar period than in other years.

A review of 6,494 cases observed during the same period in 19 hospitals in the Ruhr district shows that the incidence of ileus rose during the war period and still more during the postwar period, and that the rise was much more pronounced in the alimentary type and that with volvulus than in other types caused by kinking, strangulation, incarceration, or malignant tumors. The genesis of this group is attributable to anatomic predisposition and mechanical functional processes.

The second type of ileus is of neurogenic origin and is due to conditions caused by intussusception, gallstones, or intestinal parasites. No rise of incidence of this type was noticed during the war or in the postwar period. Such conditions arise when anatomic predisposition is aided by functional factors which, however, unlike the first group, are not of a mechanical but of a spastic character.

JOSEPH K. NARAT, M.D.

Diverticula of the Small Intestine (Les diverticules de l'intestin grêle). P. HILLEMAND, E. CHÉRIGIÉ, ROSENSTIEL, and T. IGLESIAS. *Arch. mal. app. digest.*, Par. 1951, 40: 836.

Diverticula of the small intestine occur approximately twice as frequently in men as in women, affect chiefly the Anglo-Saxon race, and are found mostly in patients over 40 years of age.

According to pooled statistics, this condition was found 33 times in the course of 24,907 roent-

genographic studies of the small intestine. In descending order of frequency, diverticula are found in the following organs: colon, duodenum, esophagus, stomach, and the small intestine, especially the upper third of the jejunum. As a rule, diverticula are multiple and may vary greatly in size in the same individual.

Congenital diverticula are located at the free border of the gut, while acquired lesions involve the mesenteric border.

Contrary to similar formations in other organs, diverticula of the small intestine usually remain silent or asymptomatic. However, vague abdominal pains, meteorism, and flatulence may be provoked in some instances. If diverticulitis develops, it may lead to perforation or hemorrhage.

Conservative treatment is the method of choice unless perforation requires surgical interference.

JOSEPH K. NARAT, M.D.

Roentgen Findings in Ileojejunitis. RICHARD H. MARSHAK, A. I. FRIEDMAN, B. WOLF, and B. B. CROHN. *Gastroenterology*, 1951, 19: 383.

Ileojejunitis constitutes that form of chronic enteritis in which a granulomatous process, similar histologically to that found in terminal ileitis, involves other segments of the small intestine. The distribution of the pathologic involvement may take one of three forms: (1) localized jejunitis, (2) a progressive form in which the process originates in a distal area and, by proximal extension, eventually involves all of the ileum and most of the jejunum, and (3) diffuse ileojejunitis which from the outset presents involvement of all or most of the small intestine in a continuous or interrupted pattern. This article is limited to a study of those patients in the last category who, when first seen, were suffering from involvement of the ileum and the jejunum.

Briefly, the symptomatology is that of a progressive disease with a gradual onset of fever, loss of weight, abdominal pain, diarrhea, and, on occasion, incomplete obstruction. The diagnosis is frequently obscure for many months or years because the typical syndrome either does not make its appearance at all, or does so late in the life of the disease process. Frequently the presence of fever of undetermined origin leads to a tentative diagnosis of brucellosis. The association of erythema nodosum suggests rheumatic fever, or the diarrhea without careful study of the small bowel may suggest ulcerative colitis. Eight times in this series of cases, these or other diagnoses were made only to be discarded when the true nature of the condition became evident. Fever was a constant feature, although long afebrile periods may characterize the relatively quiescent stages of the illness; the range is variable but may reach 105° F. Loss of weight occurs in a high percentage of patients and is especially pronounced during the febrile periods; one patient lost 54 pounds in 6 months. Abdominal pain occurs invariably, and more frequently than diarrhea, though not always in the same patients. The pain is diffuse in character, may be predefecatory in time, but is more commonly postcibal. The quality of the pain is relatively mild until obstruction supervenes, when severe paroxysms of griping cramps replace the hitherto moderate discomfort. While complete obstruction almost never occurs in ileojejunitis, symptoms are on occasion so threatening as to make surgical intervention necessary. Diarrhea, while typical of the disease, was absent in 4 cases in the present series. Frequently, it is mild with liquid to semisolid stools containing abundant mucus, but rarely pus or gross blood. Occult blood, on the other hand, is common. Anemia of a secondary hypochromic microcytic nature occurs frequently; rarely it may be of the hyperchromic, macrocytic type.

Physical examination of a case of ileojejunitis may be entirely negative. Some of the cases show well maintained nutrition; others give evidence of varying degrees of malnutrition. A mass in the abdomen is occasionally present (9 cases). Clubbing of the fingers was noted in 12 cases and the edge of the spleen was palpable 7 times in this series. Either a history of rectal complication or the actual presence of a perirectal abscess was noted in 8 patients. Both internal and external fistulous tracts are less common in this disease than in terminal ileitis; in this series, two external and two internal fistulas were recognized. One of the external fistulas "pointed" into the right flank and drained spontaneously, the other into the scar of a previous laparotomy.

The present study includes 49 cases—14 females and 35 males. The roentgen features closely follow the pathologic changes, and have been divided for the purpose of classification into nonstenotic and stenotic forms. Thirty-eight cases were listed as nonstenotic and 11 cases as stenotic. The roentgen features of the nonstenotic type of ileojejunitis in this series are blunting and thickening of the mucosal folds, and, as the ulcerating process proceeds, by the presence of one of several types of abnormal mucosal pattern. These are designated for convenience as cobblestoning, reticulation, and cast form. These mucosal changes are associated with local diminished mobility, straightening of the loops of bowel, and later by rigidity of the involved segments of small intestine, wide spacing between the loops and, finally, narrowing of the lumen. On occasion the appearance of pseudodiverticula is noted, and rarely large finger print-like defects simulating intramural tumors.

The findings most frequently seen in the stenotic type of lesion are long areas of stenosis resembling rigid pipe stems with proximal dilatation. Disease may or may not be present in the dilated segments of bowel. The loops are widely separated and maintain a fairly constant relationship to one another. The mucosal pattern is usually reticulated or cast-like, and numerous small filling defects may be noted. "Skip" areas are easily identified, masses are more frequent, and fistulas may be demonstrated.

Differential diagnosis usually presents no problem. On occasion the roentgen features may be confused

with the changes observed in the small bowel in lymphosarcoma and tuberculosis.

BENJAMIN GOLDMAN, M.D.

An Appraisal of the Long-Term Results of Surgical Treatment of Regional Ileitis. JOHN H. GARLOCK, BURRILL B. CROHN, SAMUEL H. KLEIN, and HARRY YARNIS. *Gastroenterology*, 1951, 19: 414.

This study has crystallized certain observations which deserve emphasis. The original paper included patients who were followed from 2 to 14 years. In the present communication, the period of observation of the same patients has been lengthened to from 9 to 21 years. The authors point out that the long period of excellent health before recurrence develops makes for excellent palliation, if one were to consider operative treatment palliative rather than curative. No other form of therapy has so much to offer for so long a period of time.

There appears to be a marked difference in the mortality and recurrence rates between the ileocolostomy operation and the resection procedure. In the former the operative mortality was zero and the overall recurrence rate was 22.8 per cent. In the latter the mortality was 14 per cent and the overall recurrence up to 46 per cent. An important observation has been that the late recurrences show a distinct tendency to spontaneous healing. Other than the possibility that the disease has "burnt itself out," there is no explanation of this finding. A not insignificant number of patients died years later of intestinal obstruction due to mechanical causes. However, the authors do not believe that the incidence of late obstruction in this particular group is any greater than will be found in the general population of patients who have undergone operations for other abdominal ailments.

Finally, they report that recently carried out extensive resections of the small bowel for jejunoileitis in a few patients (not reported in this paper) have shown their rapid recovery, weight gain, and minimal bowel disturbance. For many years the opinion has been held by surgeons that extensive resections for diffuse small bowel disease would necessarily result in severe nutritional disturbances, frequently incompatible with life. In one patient, referred to herein, only 3½ feet of normal jejunum remain, yet there has been a weight gain of 30 pounds, diarrhea is minimal, and the patient has returned to work. This change in attitude with respect to radical and extensive resection of the small bowel may alter our approach to the recurrence problem in the surgical therapy of ileitis.

BENJAMIN GOLDMAN, M.D.

Diet and Appendicitis. L. W. VAN OUWERKERK. *Arch. chir., Neerl.*, 1951, 3: 164.

Appendicitis is of frequent occurrence in Northern Europe, America, and Australia, but it is rare among the natives (not European residents) of Asia and Africa. The incidence among the natives increases when they assume European nutritional habits.

Before World War II, severe cases of appendicitis were frequently encountered among the Dutch, both in Europe and in Indonesia, but this disease was rarely observed in Indonesians who kept to a strict native diet. The diet of rice in insufficient quantities, unprocessed vegetables, and practicably without meat and fat, which Dutch women and children received in a Japanese internment camp in Indonesia, reduced the incidence of appendicitis to practically nil.

The mortality from appendicitis in the Netherlands not only decreased during the War, but also during the immediate pre-war years when the diet had already become less ample. There is, therefore, a possible relationship between diet (especially the fat ration) and the frequency of appendicitis, and the mortality due to it.

SAMUEL KAHN, M.D.

Acute Appendicitis in Children. GEORGE B. PACKARD and CARL H. MCLAUTHLIN. *J. Pediat.*, S. Louis, 1951, 39: 708.

The authors analyze the cases of 329 children coming to operation for appendicitis at Denver Children's Hospital in the 5 year period from July, 1945 to July, 1950. During this period 18.2 per cent of the patients had local peritonitis at the time of operation and 4.9 per cent had diffuse peritonitis. There was 1 death. In 10.4 per cent of the series there was no pathologic condition of the appendix. Mesenteric adenitis was the most frequently confused pathological process, of which there were 10 cases. All patients were under 14 years of age. Antibiotics were used throughout the series, when indicated. The right rectus incision was employed in 60 per cent of the cases and the McBurney incision in the remainder.

Regardless of all therapeutic measures such as antibiotic therapy and adequate intravenous hydration, perforation with peritonitis increases the rate of postoperative complications 16 times and the average hospital stay is increased three-fold.

HAROLD LAUFMAN, M.D.

Primary Carcinoma of the Appendix; A Report of 2 Cases. ROBERT J. SILLERY. *J. Am. M. Ass.*, 1951, 147: 854.

Primary carcinoma of the appendix, according to the literature, should not be considered rare. Because malignant disease of the appendix does not produce unusual clinical symptoms, careful histologic investigation must be done whenever a tumor is present.

The author reports 2 cases of this condition, one in a 55-year-old man and the other in a 34-year-old woman. In each case the appendix had been removed without suspicion of the true character of the gross lesion. However, its appearance was highly reminiscent of common colonic malignant tumors. Despite the true carcinomatous character of the lesion and the possibility that a remnant had remained after the excision of the appendix, appendectomy gave a very good result. Rapid recur-

rence and metastases appear to be most rare in these cases. STEPHEN A. ZIEMAN, M.D.

The Surgical Management of Regional Enteritis and Ulcerative Colitis. ALFRED S. FROBESE. *Surg. Clin. N. America*, 1951, 31: 1725.

Surgical intervention in chronic stenosing regional enteritis should be confined to the cases complicated by obstruction, abscess, or fistula, and to those in which a most thorough medical regimen has failed.

Radical excision of the diseased bowel has been practiced whenever possible. The results of this surgery have been disappointing. Recurrence after radical resection was found in 58 per cent of a closely followed-up group of cases. Ileotransverse colostomy with exclusion has been used and has given good results. This procedure is less hazardous, and longer follow-up studies may show that it gives superior results.

Improvement in the preparation of patients and of the surgical technique, in addition to the use of fitted bags, has materially altered the results of surgery in ulcerative colitis. The indications for surgery in ulcerative colitis are hemorrhage, obstruction, perforation, arthritis, danger of malignant degeneration, and medical intractability. The surgical aim is interruption of the fecal stream by ileostomy and resection of the diseased bowel. Ileostomy alone should not be performed for ulcerative colitis. If ileostomy is necessary, the diseased colon must be removed also. In most cases, an ileostomy and partial colectomy are done in the first stage of operation. The remaining colon and rectum are removed at the second stage. This has not increased the mortality and has decreased the morbidity. If ileostomy and colectomy are necessary for ulcerative colitis, the rectum should be resected. The operative technique is discussed.

SAMUEL KAHN, M.D.

The Pathogenesis and Clinical Management of Megacolon with Emphasis on the Fallacy of the Term "Idiopathic." C. MARSHALL LEE, JR., and KENNETH C. BEBB. *Surgery*, 1951, 30: 1026.

In every case of megacolon it is essential only to recognize that obstruction is present and to seek and correct its cause. On this basis the condition readily falls into three general categories.

1. Achalasic or aganglionic megacolon (true Hirschsprung's disease). Achalasic megacolon presents a strikingly different pattern from the two other types of megacolon. Recognition of the fact that the parasympathetic ganglia are deficient in the terminal segment explains the functional obstruction. A type of mass contraction can and does occur in it, but there is no orderly peristaltic wave, and, although the bowel appears to be grossly normal, the functional obstruction of achalasia is present. Since the fecal stream at the terminal level has undergone maximal water absorption and is semisolid, an uninterrupted and effective peristaltic wave is even more essential to its passage here than it might be in those parts of the bowel where the content is liquid. Nearly always, the achalasic segment starts at the anus and extends for a variable distance up the left colon, usually only into the sigmoid.

Regardless of the level to which the ganglion deficiency extends, it is here that the obstructive process lies, and the bowel is dilated and hypertrophied above it. The roentgenographic picture is also characteristic in the well advanced case, that is, when the megacolon is well established and has not been decompressed by early colostomy.

In contrast to either the symptomatic or functional megacolon, (1) the onset of obstructive symptoms occurs at birth or within the first few days thereafter; (2) morbidity and mortality from episodes of acute obstruction are high; and (3) the obstruction can be relieved temporarily, but never permanently, by conservative measures.

2. Functional megacolon. The authors now believe that no case of megacolon need be regarded as idiopathic and that a better term for this group of cases would be "functional megacolon." In this group of cases the source of the obstruction is the fecal impaction itself. Frequently a spastic anal sphincter is present. Usually, faulty bowel care and training is the source of the difficulty and may often be traced back to infancy. The onset, however, is never at birth. An occasional patient is seen in whom a congenitally long and redundant colon (dolichocolon of Martinotti) is present. This excessive absorptive surface removes too much water from the feces and chronic constipation results. Since elongation of the bowel is much more often the result of constipation and obstructive impaction than the cause of it, very few cases require surgery.

3. Symptomatic or organic megacolon. The cause of the obstruction is grossly demonstrable, usually by simple digital examination. The most common single cause in children is stricture following operations for imperforate anus. Failure to provide adequate dilatation over a long enough period of time permits progressive cicatricial narrowing of the surgically-produced anal opening. Bowel movements become increasingly difficult and painful, and as fecal impaction develops and persists the situation grows worse and an extensive megacolon may result. Other causes of obstruction may be tumors (intrinsic or extrinsic) and, although the anomaly is rare, the congenital stricture of Type I anorectal anomaly (classification of Ladd and Gross). Usually the symptoms do not develop rapidly.

As to the treatment of achalasic or aganglionic megacolon, the authors do not believe that either sympathectomy or intra-abdominal segmental resection exerts any direct or permanent beneficial effect on the condition. The only rational treatment is removal of the obstructing segment. Swenson's operation or Hiatt's modification of it appears to offer an entirely satisfactory method of effecting this correction.

When only a part of the colon is dilated and hypertrophied and when it is possible to obtain a segment

of a size readily compatible with para-anal anastomosis, the one-stage procedure of Swenson is preferred. In some patients, such as those who not only have acute obstruction but in whom the impaction cannot be relieved and the bowel decompressed and cleared by enemas, a preliminary colostomy may be necessary. If there is enough movable descending colon of reasonably normal caliber to permit para-anal anastomosis, the authors do not wait for the distended bowel to return to normal, but proceed with Swenson's operation as soon as the patient's condition permits. If the dilatation and hypertrophy require the sacrifice of too much potentially normal bowel a colostomy is preferred and when the dilatation and hypertrophy have receded so that the colon is compatible in size with the para-anal terminal rectum the pull-through procedure can be done without sacrifice of any bowel but the achalasic segment.

In the treatment of functional megacolon surgery is not needed because obstruction in functional megacolon is due entirely to the fecal impaction. In rare cases, in which dolichocolon is a factor, surgery may be required.

The treatment of symptomatic or organic megacolon depends upon the nature of the obstruction. Stricture demands a course of dilatation combined with medical rehabilitation of the bowel function. Frequently the stricture is so narrow and firm that the initial dilatations must be done under general anesthesia. Thereafter they may be done with the finger without anesthesia. When the obstruction is due to tumor, either intrinsic or extrinsic, operation is essential and in the rare case of stricture not amenable to dilatation, a plastic procedure may be required.

Special emphasis should be given to the importance of Hiatt's observations on the use of enemas in megacolon. Cases of sudden and unexplained fatal collapse may occur when the patient appears, temporarily, to be getting along well on conservative management. The use of tap water for enemas may result in a sudden "water intoxication." There is a sharp drop in the plasma sodium, chloride, proteins, and serum potassium, and a rise in the plasma volume. Apparently the hypertrophied and dilated bowel absorbs water much more rapidly than does the normal colon and the disturbance of the electrolyte balance, especially of sodium, may be fatal. This danger is common to all types of megacolon, and it is obvious that tap water should not be used for decompressive enemas. Isotonic saline solution can safely be used except in patients with impaired cardiac or renal reserve. In these cases a 7 per cent gelatin solution is recommended.

ROBERT TURELL, M.D.

Cancer of the Large Bowel; An Analysis of 580 Lesions. HAROLD C. SPEAR and SCOTT C. BRAINARD. *Ann. Surg.*, 1951, 134: 934.

An analytic study of 580 adenocarcinomas of the colon and rectum occurring in 568 patients seen at the New Haven Hospital, New Haven, Connecticut, during the years 1922 through 1949 is presented because it is deemed expedient to continue adding series of cases to those already reported, in order to provide an ever-expanding fund of experience on which to draw for a comparison of the results of the older, more standardized methods of management of cancer of the large bowel with any new technique. In addition, by subdividing the cases amenable to a curative operation into those seen from 1922 through 1939, and those seen from 1940 through 1949, the authors illustrated the results of improved methods of preoperative, operative, and postoperative management of the past decade.

The lesions included in the study were selected to the extent that the diagnosis was confirmed either by histologic examination or by operative exploration. A small number of lesions was excluded when the biopsy was either inadequate or not done, and when concomitantly, the operation or sigmoidoscopy still left some question as to diagnosis.

The age and sex incidences, familial factors, symptoms and signs, and the laboratory and roentgenologic findings were analyzed.

The over-all resectability rate was 56.8 per cent, the highest rate (63.2 per cent) occurring among colonic lesions on the right side. There were 28 operative deaths among the 293 curative resections, an operative mortality rate of 9.6 per cent. The causes of the operative deaths have been evaluated, and it was found that more than half could have been avoided if intestinal antiseptics, anticoagulants, and antibiotics had been available. One can assume that this estimate is correct from the fact that the operative mortality rate has dropped to 4.4 per cent during the past 5 years.

Nineteen and four-tenths per cent of all the patients seen, or 37.9 per cent of all who underwent curative resection, survived 5 or more years postoperatively.

Forty-three per cent of those patients who survived curative resections lived 5 or more years following operation, the highest survival rate (65.5 per cent) occurring among those with colonic lesions on the right side.

If the reported calculation of survival rates was made exclusive of operative deaths, there was noted to be little improvement in results during the 23 years from 1922 through 1944. This was interpreted as an indication that little change has taken place in the principles of surgery per se for cancer of the large bowel.

Prophylaxis of Postoperative Obstruction in Surgery of the Colon (De la prophylaxie des occlusions post-opératoires en chirurgie colique). JEAN CHARRIER and PHILIPPE MASSE. *Sem. hôp. Paris*, 1951, 27: 3371.

In the authors' material the postoperative mortality after surgery of the rectum and the colon was 6.9 per cent, and obstruction was responsible for less than one-third of the fatalities.

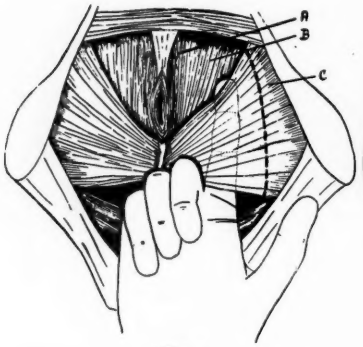

Fig. 1.

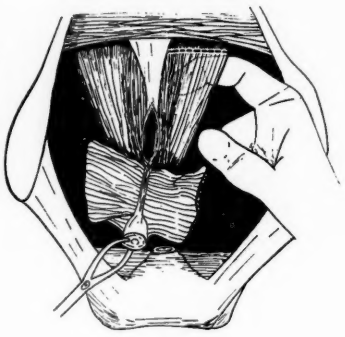

Fig. 2.

Fig. 1 (Hughes). Division of the iliococcygeus portion of the levator ani. This part lies superficial to the rest of the levator ani. *A*, Puborectalis. *B*, Pubococcygeus. *C*, Iliococcygeus.

Fig. 2. Division of the pubococcygeus and puborectalis portions of the levator ani. Muscle section should be carried as close to the midline as possible.

Postoperative occlusion is usually caused either by infection or by mechanical factors. While a generalized infection leads to a paralytic ileus, an attenuated localized infection may produce a kink of an intestinal loop. Among the mechanical factors, the following may be mentioned: internal hernia, bands, talcum powder, volvulus, and anastomotic strictures.

When an ileotransversostomy, without exclusion of the right colon, is performed, the mesentery should be sutured to the lower aspect of the transverse mesocolon to prevent an intestinal loop from slipping in behind the anastomosis. The same maneuver should be employed after ileotransversostomy with exclusion, and after the procedure of right hemicolectomy.

Great fragility of the left half of the transverse mesocolon requires very careful suturing of the latter after resection of the left half of the transverse colon.

A hiatus formed after ileosigmoidostomy between the mesentery of the ileum and the mesocolon of the sigmoid should be closed.

Contrary to Babcock's opinion that complete peritonealization in his operation is not essential, the authors believe that it is imperative to prevent the formation of adhesions between the small intestine and denuded surfaces.

After total colectomy, a rent is formed through which loops of the small intestine may slip. The borders of this rent are in front of the major curvature of the stomach, behind the peritoneum lying in front of the pancreas, on the right side of the junction between the fixed and the immobile parts of the first portion of the duodenum, and on the left side of the gastrosplenic and the pancreatosplenic ligaments. This orifice must be closed.

JOSEPH K. NARAT, M.D.

Cancer of the Rectum in the Same Field as Amebiasis (Cancer du rectum sur terrain amibien). M. CHIRAY and R. DUPUY. *Sem. hóp. Paris*, 1951, 27: 2824.

The authors review the literature which pertains to the not infrequent confusion between amebiasis and cancer. The main point of their article is a reiteration of the need for accurate differential diagnosis between these two lesions.

An isolated proliferation of rectal mucosa is not necessarily a cancer, and, conversely, a hyperplastic amebiasis may be a precursor of rectal pseudocarcinoma. One rectal biopsy may miss the diagnosis of cancer and, on the other hand, improvement in the appearance of a true cancer of the rectum following emetine therapy may lead to the wrong conclusion.

Patients with either of these lesions should be subjected to repeated serial proctoscopic examinations and biopsies until a very definite diagnosis is established. Several illustrative cases are cited.

EDWARD W. GIBBS, M.D.

The Perineal Dissection in Excision of Carcinoma of the Rectum. E. S. R. HUGHES. *Med. J. Australia*, 1951, 2: 499.

The perineal dissection in excision of carcinoma of the rectum is not a difficult procedure, but it requires an intimate knowledge of the surgical anatomy of the pelvis and perineum and an appreciation of the false steps which lead to trouble; manual dexterity is an invaluable asset.

The technique described and illustrated in this article is based on a consecutive series of 70 operations.

Good exposure and good illumination are obtained by placing the patient in a left lateral position. However, the synchronous operation, which is popular and which possesses certain advantages, requires a

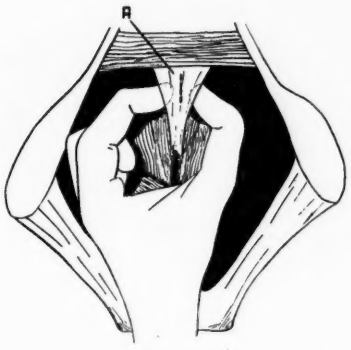

Fig. 3.

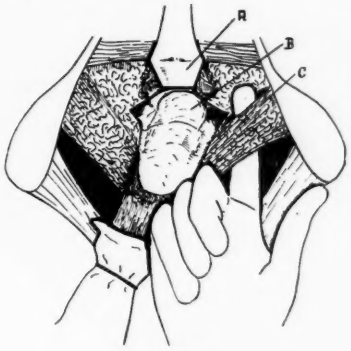

Fig. 4.

Fig. 3 (Hughes). Dissection anteriorly is barred by the anterior extension of the external sphincter (*A*). The fibers are split by forceps passed upward parallel to the prostate or vagina.

Fig. 4. The lateral ligaments are hooked down by the finger; they should be clamped before division. *A*, Retraction forward of bladder, vesicles, and prostate. *B*, Peritoneal cavity. *C*, Left lateral ligament.

lithotomy position. The anterior dissection is perhaps not so easy to accomplish in this position.

The incision is triangular in shape, with the base anterior to the anus and the apex immediately posterior to the tip of the coccyx. The area of skin excised need not be extensive, and the sides of the triangle are carried quite close to the anus.

Posteriorly, the incision is deepened and the coccyx exposed. The tip is forcibly pushed forward with the thumb of the left hand and the sacrococcygeal joint is sought with the knife held in the right hand. The bone is easily separated from the sacrum. As the knife cuts through the sacrococcygeal joint, the fascia of Waldeyer is divided and the presacral plane is entered. The posterior dissection is readily and rapidly completed by blunt dissection in this correct plane. If the coccyx is not removed, difficulty may be experienced in entering this presacral plane; moreover, the presence of the postsphincteric space between the coccygeal attachments of the external sphincter and the anococcygeal raphe of the levator ani may confuse the surgeon, as a result of which the rectum is in danger of perforation.

The finger enters from behind the space immediately above the iliococcygeus muscle. The iliococcygeus is a thin sheet and is superficial to the rest of the levator ani; the forefinger therefore re-enters the ischiorectal fossa anteriorly (Figure 1) and the muscle is divided on the outer side of the forefinger. The pubococcygeus and puborectalis are much more closely related to the rectum and anal canal. The finger is passed over their lateral edge on to their upper and inner surface (Figure 2). The muscle is divided with scissors anterior to the finger and the division is continued toward the midline until it seems that all the muscle has been cut. (Actually, it is found that the innermost fibers of the puborectalis usually escape division at this stage.)

The left hand draws the anal canal and rectum posteriorly, and the skin incision is deepened cautiously through the subcutaneous tissue, immediately behind the superficial transverse perinei muscle, the fibers of which are pushed forward. The anterior extension of the external sphincter (reinforced on its upper surface by the rectourethralis muscle and by the fascia of Denonvillier) immediately presents as a barrier to further dissection. The fingers and thumb of the left hand are placed around the rectum so that they approach each other in the midline just above this barrier (Figure 3). A pair of forceps is passed through the barrier and parallel to the posterior surface of the prostate or vagina. These forceps enter Denonvillier's space. Dissection is carried rapidly upward to the peritoneum, which is opened and divided along each side of the upper part of the rectum and the lower part of the sigmoid. Careless dissection will endanger the membranous urethra, which is usually given the added identification of a catheter. Quite often the dissection proceeds upward, posterior to the posterior layer of the fascia of Denonvillier; the rectum is then in danger of puncture and the operation is rendered more difficult.

The rectum is now free anteriorly and posteriorly, but is held on either side by the lateral ligaments. This term is given to the fatty fibrous tissue which surrounds the middle hemorrhoidal vessels. The finger is passed upward behind the lateral ligament, and the tip is flexed and brought through the areolar tissue continuous with it above (Figure 4). The ligament is hooked down, a long pair of artery forceps is applied well laterally, and the ligament is divided on its inner side. Sometimes the lateral

ligaments can be cut safely without the application of artery forceps because the middle hemorrhoidal vessels show considerable variation in size and number.

When the pelvis has been eviscerated and a large defect exists in the peritoneal cavity, an oilskin bag is packed with gauze and inserted into the cavity. When there is a steady ooze from veins on the posterior surface of the prostate and the subsequent blood loss threatens to become considerable, the cavity may be packed again with advantage. In nearly all cases, however, the skin of the perineum has been sutured around a corrugated drainage tube. Until recently the cavity was irrigated from the second postoperative day, but the results so obtained have been no better than, and possibly inferior to, those obtained without irrigation, and the procedure has now been omitted. The patient is allowed up on the first, second, or third postoperative day, according to his condition; this assists in decreasing the size of the cavity by lowering the peritoneal roof. CHARLES BARON, M.D.

The Significance of Perineal Pain Following Resection for Carcinoma of the Rectum. JOHN M. BEAL and FRANKLIN L. ASHLEY. *Surgery*, 1951, 30: 950.

During the 4-year period covered by this article of the authors, 66 patients were subjected to combined abdominoperineal resection for carcinoma of the rectum. The operation was considered palliative in 18 cases because of extension of the tumor to the periaortic nodes and liver. Fourteen of the 66 patients developed local recurrence, and the analysis of this group forms the basis of the present report.

It is of interest that 75 per cent of the lesions in this series arose in the distal 10 cm. of the rectum. This may account in part for the rather high incidence of local recurrence (21 per cent).

In the 14 patients who were demonstrated to have local recurrence, the recurrence was established from 6 to 30 months after the abdominoperineal resection. Ten patients developed symptoms of recurrence within 18 months of operation.

Thirteen of the patients with local recurrence presented themselves with pain in the perineum and the remaining patient later developed this symptom. Other symptoms consisted of sacroiliac or sacrococcygeal pain, loss of sexual potency, and bladder symptoms (dysuria, retention, frequency). The pain in the perineum in most instances was quite disabling, and the difficulty in management of some of these cases was one of the factors leading to this investigation. In all of the cases, recurrence was demonstrated by surgical biopsy or at autopsy.

Microscopic sections from the tumor removed by abdominoperineal resection were studied in the cases of the 14 patients complaining of perineal pain. Evidence of perineural invasion was found in all but 1 instance. The perineural lymphatics, particularly in the myenteric plexuses, were often found to be filled with tumor emboli. In several instances direct invasion of the nerve sheath was seen and direct extension along the nerve fibrils was found.

Lymphatic and venous invasion by tumor was frequently noted in conjunction with perineural invasion. However, 6 of the 14 cases in this series were not found to have regional lymphatic extension.

Direct attack upon the palpable recurrent lesion in the perineum was employed in 3 patients with uniformly poor results. Presacral neurectomy with local excision in 1 was without relief of symptoms.

Regional nerve blocks with alcohol and local anesthetics were of temporary benefit in 2 cases. Relief of pain for 6 to 24 hours was experienced. Local infiltration of the perineum was not successful.

Palliation was obtained with x-ray therapy for varying lengths of time in 6 patients. Two patients had three courses of x-ray therapy with decreasing relief of symptoms with each series of treatments.

Chordotomy was employed in 1 patient with satisfactory relief of pain. Most of the patients were presented to the neurosurgeons too late in the course of their disease to warrant the consideration of chordotomy or similar surgical procedures for the relief of pain. This was usually due to reluctance on the part of the patient or his family to accept such intervention. Occasionally it appeared to result from the lack of histological demonstration of recurrence. In such cases, the failure of various other methods resulted in the delay of neurosurgical assistance.

The correlation of pain in the perineum with local recurrence and with perineural extension in this series is striking. Perineal pain was associated with local recurrence of carcinoma in each of these cases.

Local recurrence would appear to be influenced by perineural invasion of the primary lesion, much as distant spread is correlated with lymphatic and venous invasion. Persistent pain in the perineal region following abdominoperineal resection is almost conclusive evidence of local recurrence of carcinoma. Earlier neurosurgical intervention should be practiced. ROBERT TURELL, M.D.

LIVER, GALLBLADDER, PANCREAS, AND SPLEEN

The Differential Diagnosis of Jaundice. HENRY J. TUMEN and EDWIN M. COHN. *Surg. Clin. N. America*, 1951, 31: 1637.

Jaundice is most simply classified as hemolytic, hepatocellular, or obstructive in origin. Hemolytic jaundice is relatively uncommon and can generally be recognized by its clinical and hematologic features. The differential diagnosis of jaundice is largely the differentiation of the obstructive and hepatocellular types.

Hepatitis—chiefly of viral origin—and cirrhosis are the most common causes of hepatocellular jaundice. Gallstones and carcinoma of the pancreas or biliary duct are the most frequent causes of obstructive jaundice.

The clinical features of greatest assistance in the differentiation of obstructive from hepatocellular

jaundice are the age of the patient, his antecedent history, the nature of the prodromal and associated symptoms (of which pain is most significant), the duration and intensity of the jaundice, and the presence and persistence of acholic stools. Splenomegaly and the ability to palpate the gallbladder are the physical signs of greatest value.

Prominent features of jaundice due to hepatocellular disease are the associated disturbances of metabolic functions of the liver. These are reflected in numerous laboratory procedures such as the flocculation tests, the galactose tolerance test, and the determination of the level of cholesterol. Obstructive jaundice is characterized by interruption of the bile flow. This causes acholic stools, lack of urobilinogen in the urine, and failure to obtain bile on biliary drainage. Such changes may be observed temporarily in some forms of hepatitis, but when they are prolonged they strongly suggest malignant biliary obstruction. In addition, elevation of the total cholesterol and alkaline phosphatase of the blood is often noted in jaundice due to biliary obstruction. The combined use of flocculation tests and alkaline phosphatase determinations will give accurate information concerning the nature of the jaundice in the majority of instances.

The most difficult problem encountered in jaundiced patients is the differentiation between extrahepatic biliary obstruction due to carcinoma and the intrahepatic suppression of bile flow occasionally seen in hepatitis. The laboratory features of hepatitis may then simulate the features thought characteristic of obstructive jaundice. Although prolonged observation of the patient and repetition of the laboratory studies will lead to the correct diagnosis in most instances, it is occasionally necessary to resort to operation in order to establish accurately the cause of the jaundice and to exclude the presence of a lesion which may be causing extrahepatic biliary obstruction.

CHARLES BARON, M.D.

Ligation of the Hepatic and Splenic Arteries in a Patient with Atrophic Cirrhosis of the Liver. JACOB K. BERMAN, LULLUS P. MULLER, CHARLES FISCH, and WILLIAM MARTZ. *Arch. Surg.*, 1951, 63: 623.

The successful treatment of a patient with atrophic cirrhosis of the liver by ligation of the hepatic and splenic arteries is reported. The patient was a man with extensive liver cirrhosis, ascites, esophageal varices, and gastrointestinal bleeding. His condition was markedly improved with decrease in the ascites, no further bleeding, and great gain in strength, appetite, and general condition. The authors have done the same procedure in 5 patients recently.

Ligation of the hepatic artery is feasible if done close to the origin of the vessel because of its rich anastomosis. The collateral circulation courses through the left gastric artery which anastomoses with the right gastric artery into the hepatic artery. An accessory hepatic artery may be present, and another type of such circulation may be through the superior mesenteric artery which gives rise to the hepatic artery in some persons.

The effects of hepatic and splenic artery ligation on the cirrhotic liver are not known. The authors believe the possible effects may be (1) mechanical, (2) functional, and (3) morphological. The rationale for this procedure is to be published in a later article.

DONALD C. GEIST, M.D.

Infection in Chronic Cholecystitis. J. RUSSELL TWISS, R. FRANKLIN CARTER, and BENJAMIN S. FISHMAN. *J. Am. M. Ass.*, 1951, 147: 1226.

A study is presented of 259 patients with chronic cholecystitis who were operated upon at the New York University Bellevue Medical Center, New York. Preoperative and postoperative cultures of the duodenal bile were obtained as well as cultures from all parts of the biliary tract at operation. Operative cultures were positive in 73, or 28 per cent, of the patients and were sterile in all parts of the biliary tract in 186, or 72 per cent, of the patients. The drainages were done with a Twiss duodenal tube with the sterile precautions of a modified Lyon technique.

The sterile and infected groups had a similar incidence of symptoms and abnormal physical findings, as well as the same percentages of abnormal cholecystograms. Gross and microscopic pathological examinations showed no significant differences in the sterile and infected groups.

In 100 of the group of 186 patients, sterile in all parts of the biliary tract at operation, the results of preoperative duodenal drainage gave one or more sterile cultures in 85 per cent of those with free hydrochloric acid, and in 61 per cent of those having no free acid. Fifty patients with sterile preoperative cultures remained sterile postoperatively.

In the group of 73 patients with pathogenic organisms in the biliary tract at operation, the predominating organisms were the Escherichia coli, Salmonella typhosa, nonhemolytic streptococcus, alpha hemolytic streptococcus, Klebsiella pneumoniae, and the Proteus vulgaris.

Stones were positive in 31 of 52 cases; the common duct bile and cystic node cultures were positive in all but 1 case each. The operative duodenal drainage in 87 per cent of the 73 patients showed pathogenic organisms. The 6 patients having sterile preoperative cultures had sterile gallbladder bile at operation. Postoperative drainage showed sterile cultures of duodenal bile in 10 of 11 typhoid carriers and in all of the patients having free acid with pure colon or streptococcus infections. In the majority of the patients having no free acid and in those having acid with mixed cultures at operation, the duodenal bile remained positive.

In both the sterile and the infected groups, there were the same incidence and type of pathologic changes and stones, which suggested that the infection was superimposed upon previously existing

pathologic conditions. However, it is pointed out that the presence of active infection makes the condition of the patient far more serious. Infectious cholecystitis can be cured only if treated in the early stages by cholecystectomy. The early recognition of biliary tract infection is for the most part dependent upon the demonstration of pathogenic organisms in the duodenal bile. With suitable sterile precautions, this can be done accurately in the majority of patients. CURTIS ARTZ, M.D.

Surgery of the Gallbladder and Biliary Passages. CALVIN M. SMYTH. *Surg. Clin. N. America*, 1951, 31: 1785.

Next to operations for appendicitis and hernia, operations on the gallbladder and biliary passages are the most numerous. The conditions of the biliary tract which require surgery are acute cholecystitis, chronic calculous cholecystitis, chronic noncalculous cholecystitis, and stones in the extrahepatic biliary ducts.

The results following operations for gall tract disease are among the most satisfactory results following general surgery. One pitfall to be avoided is carrying out surgical intervention for patients who, while exhibiting all the symptoms of organic disease, are suffering only from some functional disturbance. The operations done upon this group have led to unjustified condemnation of operative treatment for noncalculous cholecystitis.

SAMUEL KAHN, M.D.

Amputation Neuroma Following Cholecystectomy. VERNIE A. STEMBRIDGE. *Ann. Surg.*, 1951, 134: 1048.

This is a report on a 42-year-old woman who developed jaundice following cholecystectomy. A diagnosis of stricture of the common bile duct was made and an exploratory operation to repair the stricture was done 9 months after the original cholecystectomy. The common bile duct could not be identified and the patient died on the sixth postoperative day. At autopsy, a firm tumor, 1.8 by 1.5 cm., was found to blend imperceptibly into the duct wall in the area of the junction of the cystic and common ducts. The common duct was completely blocked at this point but was patent distally and proximally. The histologic pattern of the tumor was an overgrowth of the schwannian cells in whorl arrangements intermingled with neural elements.

Amputation neuromas usually occur in amputated extremities. However, there is a rich plexus of nerves in the region of the cystic and common duct junction and it is not surprising that neuromas develop in this region following cholecystectomy. A number of cases have been reported previously.

FREDERICK W. PRESTON, M.D.

Carcinoma of the Cystic Duct. D. A. T. FARRAR. *Brit. J. Surg.*, 1951, 39: 183.

Twenty-seven cases of this rare condition are assembled in a critical review (1940), and the author has added 1 more case. Before the final diagnosis of carcinoma of the cystic duct can be made, certain criteria must be met: (1) the growth must be restricted to the cystic duct; and (2) there must be no carcinoma in the gallbladder, or in the hepatic or common bile ducts.

Reports of only 5 such cases have appeared in the literature.

A correct postoperative diagnosis of cancer of the cystic duct is not possible. While the cases are too few in number for statistical analysis, the sex incidence is comparable to that of cancer in the extrahepatic bile ducts, i.e., 70 per cent of males as compared with 30 per cent of females.

FRANK B. QUEEN, M.D.

Causes of Repeated Interventions on the Biliary Tract (Ursachen der wiederholten Eingriffe an den Gallenwegen). R. DEMEL. *Wien. med. Wschr.*, 1951, 101: 801.

Failures after operations on the biliary tract occur in from 20 to 30 per cent of all cases and may be divided into 2 groups: those attributable to technical errors or incorrect evaluation of the pathologic processes, and those in which such factors do not come into consideration.

If a reconstruction of the common duct by an end-to-end anastomosis is impossible, choledochoduodenostomy or hepaticoduodenostomy is the method of choice because it produces satisfactory results in these cases.

Cholangitis or liver damage follow this operation only if stenosis develops at the site of the anastomosis. Therefore an attempt should be made to make the stoma as large as possible. If nearly the entire extrahepatic portion of the hepatic or the common duct is destroyed, hepaticojejunostomy with Roux anastomosis, as suggested by Hohlbaum, is indicated. It is also possible to perform an end-to-side hepaticojejunostomy supplemented by enteroanastomosis to prevent reflux of the intestinal contents into the biliary tract.

As a rule, a supraduodenal choledochotomy is sufficient for removal of stones overlooked at the first operation. Transduodenal or retroduodenal choledochotomy carry a greater mortality and therefore should be employed only if the supraduodenal approach has failed. Such methods may be advantageously replaced by Riedel's external choledochoduodenostomy.

A moderate benign structure of Vater's papilla may be treated with gradual dilatation accomplished through a supraduodenal choledochotomy. Choledochoduodenostomy is indicated in the presence of a marked stenosis. Exploration of the common duct and external drainage of the hepatic duct are advisable if cholangitis is present.

The author believes that the importance of postoperative adhesions is frequently overestimated and that only in rare instances do they form an indication for a second operation.

JOSEPH NARAT, M.D.

Preliminary Clinical Observations of Serum Lipase Activity as Determined by a Colorimetric Method. ARNOLD M. SELIGMAN, PHILIP GLOTZER, LESTER PERSKY and DAVID V. BERRY. *Surgery*, 1951, 30: 923.

The lipase activity of serum was determined by a colorimetric method previously described by the author. This method is believed to have advantages over the usual titrimetric methods. Normal human serum was found to contain no lipase. Consequently, the test is considered positive when any lipase activity is noted.

Determinations of lipase activity were made in patients with pancreatitis, carcinoma of the pancreas, common duct obstruction, hepatitis, gallbladder disease, diabetes mellitus, renal insufficiency, and other disease with evidence of nitrogen retention. The results are tabulated in the original article.

Lipase activity was found in the serum of some but not all of the patients with pancreatitis and common duct obstruction. It was found in 1 of the 6 with carcinoma of the pancreas but in none of those with hepatitis. Lipase activity was present in the serum of 29 of the patients with evidence of renal insufficiency. The significance of an elevated serum lipase must therefore be interpreted with regard to the state of renal function. The absence of lipase activity in cases of hepatitis suggests that the test might be useful in the differential diagnosis of jaundice.

DONALD C. GEIST, M.D.

Annular Pancreas. JOHN C. N. WAKELEY. *Lancet*, Lond., 1951, 261: 811.

A case of annular pancreas is reported in which the presenting symptom was one of indigestion. Partial resection was performed with a satisfactory postoperative result, the patient being free of symptoms for 10 years.

Once the condition is recognized, operation is the only remedy. There are two lines of such treatment: (1) division and partial resection of the annulus, or (2) a by-pass operation such as gastrojejunostomy, duodenojejunostomy, or (as in 2 of the more recent cases) partial gastrectomy and gastrojejunostomy. If the annulus is thickened by pancreatitis and shows no weak portion in the segment, its removal may be both dangerous and very difficult. In these cases it is far wiser to perform some type of by-pass operation. However, if the annulus is thin and shows a weakening or thinned portion, in view of the position of the duct in this abnormal segment a portion should be removed by dividing the annulus anteriorly on the left side of the duodenum. The real danger in resection lies in the formation of a pancreatic fistula with all its concomitant hazards.

If the ring be thin, avascular, and easily removable, resection should be performed. If, however, the ring is thickened with pancreatitis or in any way difficult to remove, a by-pass operation is preferable. If jaundice has been present or suspected, the common bile duct should be explored and any stenosis of the duct dilated. An indwelling T-tube should be left in for drainage. Cholangiograms may be of some assistance in the follow-up of cases, and a routine check-up with a barium meal is advisable.

CHARLES BARON, M.D.

Evaluation of the Secretin Test in Pancreatic Disease. ELMER W. HEFFERNON and A. R. GUNTER. *Gastroenterology*, 1951, 19: 526.

The authors present a study of pancreatic function in 25 patients. Thirty-nine tests were made, using determinations of serum amylase and lipase after stimulation with secretin and mecholyl. In only 3 of 10 cases of proved pancreatic disease was the test positive; however, in all of the 15 cases without pancreatic disease the test was negative. The test has not proved of any value in making an earlier or more accurate diagnosis of pancreatic disease.

BENJAMIN GOLDMAN, M.D.

Acute Pancreatitides; Diagnosides and Treatment. W. E. SULLENS and M. E. LICHTENSTEIN. *Ann. Surg.*, 1951, 134: 853.

Data on 50 patients in whom a diagnosis of acute pancreatitis was made at the Cook County Hospital, Chicago, are presented. The predominant age range was between 30 and 50 years. The mortality rate increased with the delay in treatment. In patients who had been ill for more than 3 days prior to admission, the mortality rate was 60 per cent. The overall mortality was 34 per cent. Abdominal pain and vomiting were the most common early symptoms. In one-third of the patients the first symptoms followed a heavy meal or the use of alcohol. In one-half the patients there was a history of a previous similar episode. Jaundice was noted in 7 patients. In those patients showing clinical shock at the time of admission, the course was usually a rapidly fatal one. Serum amylase concentration was increased in almost all the patients, but returned to normal in 1 to 4 days after subsidence of the acute process. Serum lipase remained increased for a longer period of time than did the serum amylase.

A clinical diagnosis of acute pancreatitis was not made in 30 of the 50 patients. The four acute abdominal conditions which most frequently were imitated by acute pancreatitis were mechanical bowel obstruction, biliary tract disease, peritonitis, and penetrating or perforating peptic ulcer.

Four case histories are presented, which point out the many difficulties in the differential diagnosis of acute pancreatitis.

Operation was performed on 24 of the 50 patients. The mortality was 41.6 per cent. The mortality among the patients who were not operated upon was 26.9 per cent. Abdominal exploration caused an increase in the mortality from acute pancreatitis; other procedures in addition to exploration further increased the mortality.

It is emphasized that the treatment of acute pancreatitis is conservative and is based on three requirements: (1) to decrease the activities of the pancreas and place the organ at rest, (2) to restore the

changes brought about by vomiting and loss of protein-rich fluid with shrinkage of the blood volume and loss of electrolytes, and (3) to prevent or correct the severe ileus. Papaverine, atropine, and sedatives are administered to reduce the secretory activities of the pancreas. The use of whole blood and plasma is important to combat shrinkage of blood volume. Nasal suction is almost universally required. Penicillin should be given prophylactically to minimize the danger of infection and abscess formation. It is recommended that surgery be reserved for the treatment of late complications of abscess or pseudocyst formation. When a diagnosis of acute pancreatitis is made and conservative therapy is instituted, great care must be taken and repeated examinations made to rule out the presence of an intra-abdominal condition requiring surgery. If it appears that abdominal exploration is absolutely necessary and acute pancreatitis is found, closure without drainage is the best procedure. CURTIS ARTZ, M.D.

Pancreatitis at the Royal North Shore Hospital of Sydney from 1925 to 1950. THOMAS F. ROSE. *Med. J. Australia*, 1951, 2: 453.

Eighty-nine cases of pancreatitis at the Royal North Shore Hospital, seen in the period from 1925 to 1950, were reviewed by the author. It was shown by these cases that the various syndromes of pancreatitis (acute, relapsing, and chronic) can be correlated and that they are part and parcel of the one disease entity. The various sequelae are discussed, and also the association of pancreatitis with other diseases, especially diabetes mellitus, gallbladder disease, and hepatitis. These, with the surprising exception of gallbladder disease, greatly increase the mortality. The patients were followed up as long as possible, some for 23 years, and during this time 31 died.

The results of treatment are shown to depend more on the severity of the disease than on the treatment itself. However, cholecystostomy in the presence of gallbladder disease had a very high mortality rate.

The etiology is discussed, but no further light is thrown on the subject except perhaps for some relevant negatives. ELY ELLIOTT LAZARUS, M.D.

The Pancreatitides and the Primitive Chronic Inflammations of the Sphincter of Oddi (Pancreatites et papillites chroniques primitives). HENRI SARLES and CHARLES GUIGOU. *Sem. hop. Paris*, 1951, 27: 3266.

The recurring acute attacks of pancreatitis occurring in cases of biliary calculous are well known. Also well known is the fact that in many apparently typical attacks of pancreatitis, although the choledochus is dilated and there are other signs of biliary stasis, stone is absent. For these cases the American authors, Doubillet and Mulholland, proposed the theory of hypertonicity of the sphincter of Oddi (*Surg. Gyn. Obst.*, 1948, 86: 295). Caroli described this condition as an anatomoclinical entity which he designated "primitive icterogenic papillitis." It is characterized anatomically by a glandulocystic, muscular hyperplasia with inflammatory infiltration of the papilla, and clinically by a pseudolithiasic or pseudoneoplastic syndrome.

The authors report 4 instances of chronic papillitis from their own experience (one of these with autopsy) and show that each was accompanied by pancreatic disturbances. In their study of the pancreatic disturbances, they employed the blood amylase test described by Lagerloff, which was later applied to the diagnosis of pancreatitis by Polowe (*Surg. Gyn. Obst.*, 1946, 82: 115) and others. To this test, however, was added that of lipase of the duodenal succus. It was the increase in the amylase, accompanied by a decrease in the lipase values (especially when used in conjunction with injections of secretin), which was decisive for the diagnosis. With this technique, the gallbladder was first emptied by the method of Meltzer-Lyon; a normal, or control, sample of the duodenal succus and a control sample of blood were procured; then 2 ampules of secretin (technique of Chiray and Bolgert) were injected, and fractions of the duodenal succus were taken at intervals of 10 minutes for a half hour. Five cubic centimeters of blood were taken at 15 minutes and at 30 minutes. The amylase was estimated on the blood serum only (technique of Bondi).

By this means the authors were able to show that all 4 of these patients suffered from pancreatitis, either acute or chronic; one patient who was operated upon was found to have an acute edematous pancreatitis. The pancreatitis of recurrent nature, described by the American authors, frequently presents the same clinical aspect as the icterogenic primitive papillitis of Caroli, and it may be considered that the two clinical entities are really identical.

In these patients roentgen-manometric observation showed that in the pancreatitis with icterus the enlarged pancreas might make an impression on the choledochus, but that the compression of this duct was never sufficient to disturb the biliary flow. In every one of these cases the inflammation was found to reside in the papilla, in the intramural portion of the choledochus. In the first patient, a 41 year old woman with a strong psychosomatic background, there was present, in addition to an edema of the papillary mucosa, a painful spasm of the sphincter of Oddi and of the musculature of the adjacent duodenal wall. In the second patient, a 62-year-old woman, the terminal choledochus exhibited not only an abrupt interruption above the duodenum, but also a peculiar angulation of the intramural portion of the bile duct which became more pronounced under conditions of emotional stress (increase of fluid pressure during the cholangiographic examination), and was eventually relieved by drainage through the gallbladder. In the third patient, a 52-year-old woman, there was observed in the cholangiogram a remarkable pseudolithiasic appearance which, at operation, was found to have been produced by a mucous polyp in the ampulla of Vater. In the fourth

case, the cholangiographic examination again disclosed a mucous papillitis which was greatly ameliorated by gallbladder drainage.

The treatment in every instance has consisted of gallbladder drainage, or drainage through a Kehr tube. The authors have never attempted incision of the sphincter of Oddi. JOHN W. BRENNAN, M.D.

Some Observations in a Patient with an External Pancreatic Fistula. TADAO SUGAI and AKIRA TSUBOI. *Yokohama M. Bull.*, 1950, 1: 77.

This report is concerned with the mechanism of pancreatic secretion and studies on the enzymatic functions of the pancreatic juice made in 1947 on a patient with an abdominal fistula following laparotomy for acute pancreatitis. On the tenth day following the operation a piece of necrotic tissue about 10 cm. in length separated from the wound and left a fistula from which pancreatic juice flowed freely. This material was collected and studied. The average amount obtained in 24 hours was about 80 c.c. without fasting with an increase after meals. Meals were given three times a day and the specimens were collected in test tubes which were changed every 2 hours. The secretions came to a peak in 2 hours and were back to normal after 4 hours. The least amount was obtained from midnight until morning.

The next test was begun at 6 o'clock in the morning, which was followed by breakfast at 8 o'clock. The amount of secretions were recorded hourly until the before meal values as well as the after meal values were determined. It was found that there was no fundamental difference in the secretions caused by carbohydrates or proteins, the time of secretion being parallel to the quantity of secretion. This secretion was due to absorption of glucose, certain aminoacids, and lipoids, while fats and their derivatives during digestion had no influence. For secretion the compounds previously mentioned had to travel as far as the duodenum. The gastric acidity had no influence other than acidity due to free hydrochloric acid, but it was believed that this is an entirely different mechanism than that due to diet. Regardless of whether the total amounts of secretion were high or low, they did not have any influence on the amount of enzymes or inorganic material.

When drugs were used on the autonomic nervous system it was found that the parasympathetics stimulated secretion and the sympathetics produced the opposite effect. An interesting by-product of the study was that strong preparations of pancreatic amylase and trypsin could be extracted with relative ease from the material collected from the fistula.

LEROY J. KLEINSASSER, M.D.

Primary Carcinoma of the Head of the Pancreas (Carcinoma primitivo della testa del pancreas). ANTONIO GASBARRINI. *Riforma med.*, 1951, 65: 1049.

In reviewing the subject of primary carcinoma of the head of the pancreas, the author first describes the anatomy and the physiology of the pancreas. The symptoms are variable and depend upon the location of the new growth as well as the extension and direction of the spread. A study of the functions of the pancreas is of great importance in making a diagnosis.

In a normal person, about 5 to 10 per cent of ingested fats are excreted in the stool. In cases in which there is suppressed pancreatic function, from 70 to 75 per cent of the fats are found in the stool. A distinction is to be made between saponified and fatty stools. With obstruction of the common duct, the stools have a grayish, pasty appearance and are rich in saponified acids, which are insoluble. However, if the duct of Wirsung is obstructed, the stools are rich in neutral fats and fatty acids. They contain few saponified acids.

Great advances have been made in collaborating clinical, radiological, functional, and pathological studies. There are, however, some points which remain to be explained. The author believes that a diagnosis of primary cancer of the head of the pancreas is possible in a majority of the cases.

LUCIAN J. FRONDUTI, M.D.

GYNECOLOGY

UTERUS

Uterine Action, Normal and Abnormal. WILLIAM C. W. NIXON. *Am. J. Obst.*, 1951, 62: 964.

The pressing problem of disordered uterine activity (in the absence of mechanical obstruction) is discussed. The author cites various articles indicating the use of balloons within the uterine cavity, the effects of drugs, the theory of "nodes" and mass uterine contractions, and the electrical pressure receptor of Karlson. The latter is discussed in detail, as it blends in somewhat with the results obtained by this investigator.

Karlson showed inco-ordination between the corpus and the cervix of the uterus in the first stage, while later peristaltic waves brought about more uniformity of contraction and dilatation of the cervix. It has been found that the cervix contracts independently of the corpus. Moreover, dilatation of the cervix depends upon the establishment of a peristaltic pattern.

Other investigators found adenosine triphosphate to be the chemical fuel for contraction. Later, actin and myosin were isolated from the musculature of the uterus; however, a combination of both gave actomyosin, which, in the presence of adenosine triphosphate, becomes contractile. The distribution of actomyosin varies; it is increased in the musculature of the corpus during pregnancy, and is much higher in that area during labor.

The experimental portion of this article deals with the activity of the corpus and the cervix. Means of measuring was by the use of catheters with balloons. During hysterotomy in the first or second trimesters, measurements were taken, the balloons being filled with water and connected to mercury manometers. There is no constant relationship between the corpus and cervical activity. Experiments with various drugs revealed that the ergometrine group affected mainly the cervix, whereas the oxytocin group affected mainly the corpus. It was found also that oxytocin was as active as vasopressin in early pregnancy, but vasopressin was much more active in the second trimester. Where a pushing or impelling power was needed, as in the treatment of abortions, an oxytocin (stimulating the corpus) was the drug of choice and not one of the ergometrine group, which might contract the cervix.

The author discusses the extrinsic and intrinsic musculature in the cervix, lists the signs, symptoms, and treatment of prolonged labor, and makes a plea for more active therapy, including cesarean section.

JACK W. THOMPSON, M.D.

Clinical Value of Uterosalpingography. HARRY G. LAFORGE. *N. York State J. M.*, 1951, 51: 2475.

The author presents his findings in 150 private patients on whom a uterosalpingography was done. Only tubal findings were considered. All patients were in good health, and pelvic examination was negative in all except 5 patients in whom an adnexal mass no larger than 5 cm. in diameter could be palpated; in 7 patients a myoma was palpable. One hundred and twenty-three patients were primarily sterile and 27 were suffering from secondary sterility. The majority had had tubal occlusion to carbon dioxide insufflation.

The author used a Jarcho self-retaining uterine insufflation cannula. A flat plate was then taken with the instruments in place. (This is helpful since transverse linear markings of the sacrum are occasionally confused with the tubal lumen). Ten cubic centimeters of sodium acacia were then injected through the cannula with pressures up to 200 mm. of mercury. In 18 cases the opaque fluid entered the vascular tree. The second plate was taken as the last cubic centimeter of fluid was injected. If incomplete filling occurred a second 10 c.c. were injected and another plate taken.

Salpingographic findings in the 150 cases are summarized in the following table:

Salpingogram	Number	Conceived
Both tubes visualized and open	43	10
One tube patent and the other closed proximally	25	6
One tube patent and the other closed distally	20	6
Both tubes closed distally	22	1
One tube closed proximally and the other distally	13	2
Both tubes closed from midpoint proximally	1	0
Both tubes closed proximally	26	0
Total	150	25

Seventeen per cent of the total group of patients ultimately conceived.

WARREN R. LANG, M.D.

Practical Experience with Papanicolaou's Smears for Diagnosis of Genital Carcinoma (Praktische Erfahrungen mit dem Zellabstrich nach Papanicolaou zur Frueherkennung des Genitalkarzinoms). GERHARD WINTER. *Geburtsh. & Frauenh.*, 1951, 11: 916.

Papanicolaou's smears do not allow a definite diagnosis but represent a valuable addition to our diagnostic armamentarium by supplementing other methods. The smears are superior to colposcopy as far as cervical cancer is concerned. According to American writers, a correct diagnosis can be made in 80 per cent of the cases of cancer of the fundus but the author has not been able to reach this figure.

The author prepares 2 smears routinely, one of the secretion obtained by aspiration from the cervical canal and the posterior vaginal vault and the other of cervical scrapings. First, a magnification of from 100 to 150 is employed. If suspicious cells are found,

a magnification of from 400 to 600 is used. In this manner the duration of the examination can be shortened from 20 minutes to from 6 to 8 minutes.

Of 2,500 patients from whom smears were obtained, 150 were diagnosed as having cervical cancer, and in each instance the diagnosis was confirmed by histologic examination. Papanicolaou's smears led to a correct diagnosis in 95.4 per cent of the group.

JOSEPH K. NARAT, M.D.

The Role of Surgery in the Management of Cervical Carcinoma. HERBERT E. SCHMITZ, JANET E. TOWNE, and CHARLES J. SMITH. *Radiology*, 1951, 57: 826.

Carcinoma of the cervix is best treated by radiation therapy. Surgery is reserved for those patients with preinvasive cancer, radioresistant cancer, and cancer associated with pregnancy.

Preinvasive cancer of the cervix must be proved by biopsy to be definitely a cancer and still limited to the intraepithelial areas. Hysterectomy is the preferred treatment. Serial microscopic sections must be studied and if areas of invasion are found, the surgery must be complemented by radiation.

When cervical cancer does not respond to radiation therapy, as shown by repeated cytological and biopsy studies, surgical removal of the lymph nodes and female pelvic structures is indicated.

When a group 1 or group 2 cervical cancer occurs in a prolapsed uterus, the prolapse interferes with the intelligent application of radium. A radical Schauta vaginal hysterectomy is recommended.

In the presence of pregnancy the treatment depends upon the extent of the cancer and the period of gestation. Deep roentgen therapy is given until the fetus reaches viability. Then delivery is best handled by cesarean section. Further radiation may then be administered.

Heroic radical surgery in advanced radioresistant cancer may be attempted when no other means of hope are left. Such surgery may only be attempted under ideal conditions. Otherwise it is fraught with disaster. One cannot as yet evaluate the results of treatment of this "abandoned" group.

JOHN R. WOLFF, M.D.

Vaginal Hysterectomy. RICHARD T. WEAVER and FRED L. JOHNSON. *Am. J. Obst.*, 1951, 62: 1117.

Four hundred consecutive cases of vaginal hysterectomy are reviewed and a total of 884 cases with one operative death are reported. The authors state that the current literature reveals an increasing use of the vaginal approach to pelvic disease in the English-speaking world. Among 13,939 cases collected from the literature, the mortality rate was 0.31 per cent.

The contraindications and operative difficulties have been much exaggerated by the infrequent vaginal operator. By increased familiarity, through cooperative effort, any gynecological staff will find its enthusiasm for the procedure growing and its scope widening. In the treatment of uterine prolapse, a vaginal repair without removal of the uterus and cervix is an "incomplete operation" and rarely justified. Vaginal hysterectomy, with suitable repair, is usually the best treatment for prolapse of the uterus. Many diseased uteri should be removed through the vagina even when no repair is necessary.

CHARLES BARON, M.D.

Total Versus Subtotal Abdominal Hysterectomy. PAAVO VARA and OLAVI KINNUNEN. *Acta obst. gyn. scand.*, 1951, 31: Supp. 5.

The authors analyze 2,217 cases of abdominal hysterectomy performed at the Second Women's Clinic of the University of Helsinki in the period from 1935 to 1948. Of these, 1,805 were subtotal (373 with unilateral salpingo-oophorectomy and 797 with bilateral salpingo-oophorectomy), 395 were total (33 with unilateral salpingo-oophorectomy and 239 with bilateral salpingo-oophorectomy), and 17 were of the Wertheim variety.

For the subtotal operations, fibromyoma uteri was the most frequent indication (70.1%); then followed, in order, ovarian tumor (10.6%), inflammatory adnexal disease (12.3%), and endometriosis (3.5%). The age range of 80 per cent of all the patients was from 35 to 49 years. In 93.8 per cent of the cases in which simple subtotal hysterectomy sufficed, the indication was myoma. Next came metropathia hemorrhagica and endometriosis. In cases supplemented with unilateral salpingo-oophorectomy the indications were myoma, benign ovarian tumor, inflammatory adnexal lesions (64.1, 15.8, 13.1%, respectively). When bilateral salpingo-oophorectomy was performed in addition, the indications were myoma, inflammatory lesions of the adnexa, benign ovarian tumor, and endometriosis (53.7, 21.7, 16.6, 6.2%, respectively).

Total hysterectomy without disturbance of the adnexa was done in 64.2 per cent of the cases for myoma uteri and in 28.4 per cent for corpus carcinoma or sarcoma. Total hysterectomy and unilateral salpingo-oophorectomy was done in too few cases (33) for statistical evaluation, but the main indications were myoma, and corpus or ovarian carcinoma. Total hysterectomy with bilateral salpingo-oophorectomy was done, except in isolated cases, in women from 35 to 59 years of age. The indications were myoma, corpus and ovarian carcinoma, adnexal inflammatory disease, and benign or ovarian tumors (40.1, 29.1, 13.8, and 12.9%, respectively).

The age of the 17 patients in the Wertheim group ranged from 25 to 49 years. The indications for the operation were cervical carcinoma (12 cases) and corpus carcinoma (5 cases).

The most frequent operative complications were wound infection, thrombophlebitis (especially in older women after total hysterectomy), urinary tract infection, pneumonia, and wound hematomas. Complications were more frequent after the total than after the subtotal operation, and the temperature elevation was more persistent following the former procedure.

The mortality for the whole series was 1.53 per cent, and the deaths after the subtotal operations totalled 1.11 per cent and those after the total operations, 3.54 per cent. The causes of death were cardiovascular disease, intestinal obstruction, peritonitis, pneumonia, and acute hepatic atrophy.

These figures favor the subtotal hysterectomy, but it must be remembered that the patients were selected. Moreover, in view of the recent advantages in surgical technique, the more frequent use of blood, the newer antibiotics, and the danger of malignancy of the stump, the authors recommend the total operation whenever feasible. WARREN R. LANG, M.D.

ADNEXAL AND PERIUTERINE CONDITIONS

Small-Cystic Degeneration of the Ovaries as an Incidental Finding in Gynecological Laparotomies. PAAVO VARA and KALEVI NIEMINEVA. *Acta obst. gyn. scand.*, 1951, 31: 94.

The authors studied the findings in a total of 12,160 patients operated on at the Women's Clinic of Helsinki University during the period between 1900 and 1933, and at the Women's Clinic II of the University between 1934 and 1947. They found that 874 of the women showed small-cystic degeneration of the ovaries as an incidental finding (1 out of 14 women operated upon).

This cystic change occurred with all varieties of gynecological disease, but fibromyomas and inflammations predominated, the former occurring in 70.5 per cent of cases, the latter in 29.6 per cent. Appendicitis was present in 7.1 per cent of the cases, and extrauterine pregnancy in 5.2 per cent.

Age grouping resembled that for general laparotomy materials. The mean age of the menarche was 15 years, which is normal for Finland. Menstrual disturbances occurred in 12.5 per cent of cases, metropathia hemorrhagica in 1.4 per cent; 70.6 per cent were or had been married. The average number of children of the married women was 1.53. This is only one-half the average of Finland but it is probably explained on the basis of genital inflammation. The position of the uterus was normal in 66.3 per cent of the cases.

In conclusion, the authors are of the opinion that small-cystic degeneration of the ovaries is a condition subsidiary to other gynecological diseases and in itself is of minor clinical importance.

WARREN R. LANG, M.D.

EXTERNAL GENITALIA

Malignant Tumors Involving the Vulva. CONRAD G. COLLINS, JASON H. COLLINS, EDWARD W. NELSON, ROBERT C. SMITH, and EVAN A. MACCALLUM. *Am. J. Obst.*, 1951, 62: 1198.

Venereal granulomatous lesions seem to be a predisposing factor in the development of malignant tumors of the vulva. If hypertrophied or hyperplastic areas persist in the vulva following cure or arrest of a granulomatous venereal lesion, a radical vulvectomy should be performed. Microscopic sections from many areas of the resected vulva should be carefully studied for the presence of malignancy. Symptomatic, atrophic, or nonvenereal hypertrophic lesions of the vulva should be biopsied.

If symptoms persist despite definite medical regimen, then total vulvectomy should be performed and the whole vulva submitted to the pathologist for multiple microscopic study.

Lesions which have been proved to be intraepithelial by a study of multiple sections from an extirpated vulva may not require radical dissection of the pelvic gland.

When a vulvar malignancy has been proved to be invasive by microscopic examination, radical dissection of the pelvic gland is indicated. The gland dissection should extend from the lower portion of the abdominal aorta and inferior vena cava to Hunter's canal. The aortic, caval, common iliac, external iliac, hypogastric, obturator, Cloquet's, and the superficial and deep inguinal glands are the object of the surgical attack. If the lesion involves the bladder or rectum (or both), an anterior, posterior, or total eviscerectomy should be added to the surgical procedure.

The advent of antibiotics, blood transfusion, and modern anesthesia has allowed for a more extensive surgical attack upon malignancies of the vulva. Patient and doctor delays are still factors in defeating what otherwise might be a relatively high cure rate in malignant tumors involving the vulva.

JOHN R. WOLFF, M.D.

MISCELLANEOUS

The Climacteric Following Supravaginal Hysterectomy. KNUT KNUTSEN. *Acta obst. gyn. scand.*, 1951, 31: 9.

In an attempt to evaluate the clinical impression that climacteric symptoms follow supravaginal hysterectomy even with ovarian conservation, the author studied 118 women upon whom supravaginal hysterectomy plus conservation of at least one ovary had been performed. All the women were younger than 40 years of age at the time of operation and younger than 46 at the time of the follow-up examination. Fifty-six cases were from the Drammen Hospital, and 62 cases were from the Obstetrical and Gynecological Clinic in Oslo, Norway.

Hot flashes appeared in 52 per cent of the women, to a severe degree in 27 per cent of them. This percentage is much greater than one would expect without operation. Whether or not one or both ovaries were retained did not seem significant.

Twenty-nine per cent of the patients had regular menses or menstrual molimina after operation. These women usually had few, and mild, flashes. Fifty-one per cent had mental depression; 29 per cent had impaired memory. Simple ovarian cysts developed in 12 of the women.

As to the ovarian insufficiency, the supposed basis of the symptoms, it has been suggested that this is

due to either loss of incretory function of the uterus or to injury of the nervous and vascular connections of the ovary. At least climacteric symptoms are minimal when endometrium is retained. The author therefore suggests resection of the uterus with one of the lateral margins of the uterus—the uterine artery and a bit of the endometrium remaining intact as a means of preventing an early climacteric in younger women in whom supravaginal hysterectomy and ovarian conservation are performed.

WARREN R. LANG, M.D.

The Cytology of the Peritoneal Fluid (Beitrag zur Zytologie des Liquor peritonei). WERNER HEYDE. *Geburtsh. & Frauenh.*, 1951, 11: 910.

Paracentesis of the posterior cul-de-sac of Douglas was performed by the author on 2,963 patients. In 1,306 cases, or 44 per cent, it was necessary to employ irrigation in order to obtain fluid for examination. Blood was found in a large percentage of cases. Observation of the color and the demonstration of coagula, hemolysis, bilirubin, and erythrophagocytosis allowed differentiation of old blood from that obtained through an accidental injury of a blood vessel.

Intraperitoneal decomposition of the blood is accomplished by enzymatic chemical processes and by mononuclear macrophagocytes.

Pus was demonstrable macroscopically in 17 per cent of the febrile abortions and in 3 per cent of the afebrile abortions. Pus was detected only by cytologic examination of the exudate from 31 per cent of the patients with febrile abortion and of the irrigation fluid from 19 per cent of the same group. The corresponding figures for the afebrile group were 21 per cent and 10 per cent, respectively.

The method is of value also for the diagnosis of certain surgical conditions. For instance, the author was able to diagnose a perforated duodenal ulcer by demonstrating muscle fibers and particles of vegetables in the fluid obtained by puncture of the cul-de-sac.

JOSEPH K. NARAT, M.D.

A Study on Genital Tuberculosis in Women. HENRY JEDBERG. *Acta obst. gyn. scand.*, 1951, 31: Supp. I.

Jedberg's monograph is an exhaustive statistical study of the subject of female genital tuberculosis, with conclusions based on comparisons made between previously reported studies and his own material.

The author was fortunate, first in being able to determine the type of material necessary for the study, and then in obtaining the material, which is extensive, on a nationwide basis. All Swedish hospitals and sanatoria co-operated in the collection of data and surgical specimens.

Each chapter covers a different phase of the problem and consists of a summary of the literature and of the conclusions drawn from the material studied. The topics include bacteriology, pathogenesis, pathoanatomy, symptomatology and clinical diagnosis, roentgen diagnosis, histologic and bacteriologic diagnosis, complications, prognosis, and treatment. Of particular interest is the excellent chapter on roentgenologic diagnosis, in which films are shown. The value of the hysterosalpingogram as a diagnostic adjunct is portrayed.

Unfortunately, the author's personal experience with antibiotic and chemotherapeutic drugs is limited in time and numbers of patients. The study of patients receiving streptomycin, para-aminosalicylic acid, or TBI may yet write a new chapter to the entire problem.

HENRY C. FALK, M.D.

Contribution to the Study of Urinary Elimination of Pregnandiol in Hydatid Mole and in Chorioepithelioma (Contribution a l'étude de l'élimination urinaire du prégnandiol dans la môle et dans le chorio-épitéliome). H. PIGEAUD and R. BURTHIAULT. *Gyn. obst.*, Par., 1951, 50: 341.

The authors studied the amount of pregnandiol excretion in the urine in a series of 24 cases of hydatid mole, 3 of which were complicated by chorioepithelioma.

Contradictory statements are found in the literature as to the influence of hydatid mole and chorioepithelioma on pregnandiol excretion. Whereas most authors report decreased values or the absence of pregnandiol, increased values have been found by some. Also, the question whether corpus luteum cysts influence pregnandiol excretion has been answered variously.

The authors analyzed their cases as to clinical symptoms, the month of gravidity, the mode of expulsion, the anatomic and histologic character of the mole, and the presence of ovarian cysts.

During the development of the mole, pregnandiol excretion may be decreased, normal, or elevated as compared to the average level at the corresponding stage of pregnancy. In most cases the excretion seems to correspond with the degree of activity of the mole as shown not only by the level of gonadotropic hormone but by clinical, anatomical, and histological findings. Absence of pregnandiol in the urine nearly always indicates a dead mole. Low levels (less than 10 mgm.) are observed usually in the presence of dead moles or moles with low activity, whereas abnormally high levels are seen in the presence of very active moles. The presence or absence of ovarian cysts does not influence the level of pregnandiol excretion.

After evacuation of the mole a certain amount of pregnandioluria nearly always persists for several days, a fact never observed in simple abortion. Therefore, if in an apparently normal abortion pregnandiol is excreted after the evacuation it should be suspected, in retrospect, that partial mole degeneration had taken place.

Persistence of pregnandioluria for more than 2 weeks after expulsion suggests complications; the dosage of gonadotropic hormone should be increased considerably in these cases.

In the 3 cases of chorio-epithelioma the level was very high (more than 20 mgm.); the pregnan-

dioluria disappeared completely immediately after hysterectomy.

Various theories and hypotheses as to the origin of the pregnandiol have been propounded in the literature. The authors discuss the possible role of the adrenal gland, the syncytium cells of the placenta, and the ovary in the genesis of pregnandioluria. The diagnostic and prognostic value of the degree of pregnandiol excretion is emphasized.

WERNER M. SOLMITZ, M.D.

Mitosis in Normal Endometrium and Genital Cancer. SAKARI TIMONEN. *Acta obst. gyn. scand.*, 1951, 31: Supp. 2.

The author presents an analysis of the cytologic character of genital cancer. Ten cases of normal proliferative endometrium, 1 case of hyperplastic endometrium, and 30 cases of various types of genital cancer were studied with special reference to chromosome numbers, nuclear size, mitotic irregularities, and relative duration of mitotic phases.

Chromosome counts of 1,000 cells of the normal endometrium gave numbers varying between 4 and 104, with the *highest peak* at 21 to 25 chromosomes and a much *lower one* at 46 to 50. Malignant tissue is known to possess a great variation in chromosome numbers, but because of "stickiness" it was possible to count chromosomes accurately in only 2 cases of corpus carcinoma and these showed a chromosome number ranging around 33 and 20 to 50, respectively.

Nuclear size remained constant among cases of normal endometrium. In the 2 cases of cancer in which it was possible to estimate nuclear size, there seemed to be a slight decrease.

Mitotic irregularities in cancer were analyzed in detail. Hollow spindles occurred as frequently in cancer as in normal endometrium and this abnormality, therefore, cannot be regarded as characteristic of cancer. A constant difference between normal chromosomes and cancer chromosomes was their varying appearance in early prophase. Normal chromosomes become visible as long, almost thread-like structures, whereas cancer chromosomes are thicker, shorter, and less distinct. The only features present in cancer, but absent in normal tissues, were multipolar spindles and a change in the relative duration of prophase and metaphase, the former becoming shorter and the latter longer. The author proposes the use of a *prophase index* (ratio of relative durations of metaphase and prophase) for more accurate tabulation of results.

WARREN R. LANG, M.D.

OBSTETRICS

PREGNANCY AND ITS COMPLICATIONS

Studies on the Iron Deficiency Anemia of Pregnancy. CURTIS J. LUND. *Am. J. Obst.*, 1951, 62: 947.

Determinations of plasma volume and erythrocyte protoporphyrin augment routine hematological methods in the identification of iron deficiency and in an evaluation of the response to therapy. The results indicated have been computed from the low income group, of which 90 per cent were Negroes. New prenatal patients were screened by determination of the capillary hemoglobin (by pricking the finger). Thereafter, venipuncture and drawing the blood into a syringe moistened with heparin constituted the means of obtaining the specimen. In prenatal patients, it was found that 20 per cent have a hemoglobin below 10 gm. per cent, and 50 per cent have a hemoglobin below 11 gm. per cent. The finger prick method is very inaccurate (generally 0.5 gm. per cent lower than venous blood). From the studies made, there is no evidence that repeated childbearing increases the incidence of anemia. Also, little difference was found between primigravidas and multiparas. In the studies conducted, 31 patients were used as controls and 35 patients were under treatment.

The plasma cell volume increased during pregnancy from 14 to 121 per cent, with an average of 48 per cent. The peak was reached between the thirty-second and thirty-eighth weeks. The changes found were unrelated to the presence or absence of anemia. These investigators found that the plasma cell volume was the most accurate means of determining the hematological mensuration. The method used is discussed. Normally the erythrocyte protoporphyrin is bound with iron. If an iron deficiency exists, more erythrocyte protoporphyrin is free, and increased amounts are found in the red blood cells. Thus, the erythrocyte protoporphyrin is useful in the detection of iron deficiencies and in therapeutic responses.

In the patients treated, molybdenized ferrous sulfate was used (6 grains three times daily), and the results parallel those of normal untreated controls. The hemoglobin decreased progressively and the erythrocyte protoporphyrin increased. All anemias were treated. It is stated that 6 weeks of oral iron therapy in the anemic mother will produce the equivalent of 4 transfusions at a fraction of the cost. A better response is obtained when the patient is treated late in pregnancy. The erythrocyte protoporphyrin fell within normal range following 6 to 8 weeks of iron therapy.

Anemia is the reduction of hemoglobin and/or red blood cells per unit volume of blood below some arbitrary standard. A compensatory increase in the plasma volume occurs as the total mass of hemoglobin diminishes. However, there is a definite increase in total hemoglobin during pregnancy. There is little justification for the continued use of the term "physiological anemia of pregnancy." There is no anemia in a normal pregnancy, only an apparent one. Hemoglobin levels below 11 gm. per cent after the twenty-eighth week of gestation suggest a true anemia except in those patients with excessively high plasma volume determinations. It was found that total hemoglobin can be pushed up in the absence of iron deficiency. It is suggested that the uptake of iron by the pregnant woman is increased. The patient promptly loses this hemoglobin during the puerperium; 90 to 95 per cent of the cases of iron deficiency anemias of pregnancy can be treated with oral preparations of ferrous sulfate. There is nothing to suggest that liver extract or related substances have any place alone, or in combination with iron, in the treatment of iron deficiency anemia of pregnancy.

Results show that active treatment with iron in the first or second trimester will not only restore the normal amount of hemoglobin but will produce a normal increase in the total hemoglobin. The treatment may be stopped at delivery. If the anemia is not discovered until the last trimester, full response will not occur before delivery and the treatment should be continued for 6 to 8 weeks postpartum.

JACK W. THOMPSON, M.D.

On the Toxemias of Late Pregnancy. PAAVO VARA and KAISA VEHNIÄINEN. *Acta obst. gyn. scand.*, 1951, 31: Supp. 4.

The authors present a rather extensive review of the literature concerning the toxemia of late pregnancy. For the purpose of clarification, they include a classification which is similar to that composed by the American Committee on Maternal Welfare. Some clinical observations are made concerning the duration of labor, the incidence of obstetric operation, and the maternal and fetal mortality. The role of the placenta as the etiologic agent is briefly presented, and there is an excellent discussion concerning the changes in the chemistry of the body.

JAMES F. DONNELLY, M.D.

Observations on the NaCl Content of Whole Blood, Plasma and Red Blood Cells in the Late Toxemias of Pregnancy. PAAVO VARA and KAISA VEHNIÄINEN. *Acta obst. gyn. scand.*, 1951, 31: Supp. 6.

The authors present a short monograph concerning their observations on the sodium chloride content of whole blood, plasma, and red cells in the late toxemias of pregnancy. The patients with acidosis were placed in one group, and these showed a significant decrease in chloride concentration of whole blood. In another group which presented no acidosis there appeared to be a decrease, although this was not statis-

tically significant. These patients were placed on low salt diets and a further decrease was noted.

JAMES F. DONNELLY, M.D.

A Glandular Form of Toxoplasmosis in Connection with Pregnancy. SVEN GARD and J. HENNING MAGNUSSON. *Acta med. scand.*, 1951, 141: 59.

The diagnosis of toxoplasmosis is usually made at autopsy or by serologic methods, and it is uncommon to find 2 cases with previous clinical manifestations. The authors describe a case of toxoplasmosis which occurred during pregnancy, the diagnosis being made on the basis of biopsy of a lymph node, and on serologic tests. The patient recovered and subsequently delivered, with no evidence of any infection in the child. JAMES F. DONNELLY, M.D.

True Sacculation of the Contractile Portion of the Pregnant Uterus. WILLIAM H. RUBOVITS. *Am. J. Obst.*, 1951, 62: 1044.

Four cases of diverticula of the contractile portion of the pregnant uterus are presented. It is emphasized that these are true sacculations of the uterine corpus and not comparable to the "functional sacculation" described in the general obstetrical literature. A postulate is offered that this condition may occur because of an exaggeration of the normal implantation phenomena with weakening of the adjacent uterine musculature and resultant sacculation as pregnancy progresses. To date, the diagnosis of true sacculation of the contractile portion of the pregnant uterus has not been made prior to delivery, laparotomy, or autopsy, except in Hess's case.

True sacculation probably always begins very early in pregnancy. It is, therefore, most important to study carefully the irregularities in uterine contour so frequently found at the time of the early first prenatal examination. Persistent low abdominal pain in early pregnancy in a previously healthy woman may not be ignored and the patient should not be assured that it is one of the minor ailments of pregnancy. Although frequent abdominal examinations late in pregnancy might reveal an existing sacculation, it is more probable that the sac blends with the normal portion of the corpus in such a manner as to escape detection. Soft tissue technique roentgenography may prove useful for diagnosis, especially in those cases in which threatened uterine rupture is even remotely suspected. Manual exploration of the uterine cavity in the third stage of labor is an exact diagnostic procedure.

CHARLES BARON, M.D.

PUERPERIUM AND ITS COMPLICATIONS

The Pathogenesis and Treatment of Postpartum Phlebitis (Aspects cliniques; Pathogénie et traitement des phlébites du post-partum). J. CADERAS DE KERLEAU, P. CAZAL, and P. IZARN. *Presse méd.*, 1951, 59: 1499.

Puerperal phlebitis of infectious origin has become extremely rare since penicillin has been used routinely in all cases of suspected puerperal infections. However, another apparently not infectious type of thrombophlebitis is frequently observed. This form is characterized by early onset (between the eighth and twelfth days of the puerperium), normal lochia, absence of hyperleucocytosis, and negative blood culture. A hereditary tendency toward phlebitis and placenta previa are the most important predisposing factors. It is possible that repeated small hemorrhages during the last trimester of pregnancy, as they occur in placenta previa, may increase the blood coagulability and so predispose to thrombophlebitis.

Routine examinations of the clotting time and sedimentation rate should be made at short intervals in all cases of placenta previa and in patients with a family or personal history of phlebitis. At the first sign of phlebitis, treatment with anticoagulants should be started.

The authors apply intravenous therapy with heparin, 75 mgm. every 4 hours for 3 to 6 days. To replace heparin by dicumarol after the first 24 hours is not advisable after delivery as the dicumarol may cause uterine hemorrhage. Controls of the coagulation time during the heparin treatment should not be repeated more often than once every 24 hours because of the danger of obstruction of the veins needed for the treatment.

Hemorrhagic episodes occur quite infrequently with the suggested dosage. Hematuria is always the first sign of hyperheparinemia and indicates immediate reduction of the dosage. The urine should be controlled at frequent intervals.

After the twentieth day of the puerperium the heparin is replaced by dicumarol ethyl acetate which is given by mouth in decreasing amounts, beginning with 600 mgm. every 6 hours for 3 days to 300 mgm. every 12 hours on the seventh to the ninth day. The prothrombin level should be controlled daily during the dicumarol therapy.

Penicillin is completely ineffective in phlebitis of the leg and the iliac vein, whereas the fever falls immediately after the first few injections of heparin. Only in septic thrombophlebitis of the pelvic veins should penicillin or other antibiotics be combined with the heparin treatment.

Infiltrations of the lumbar sympathetic nerve are contraindicated during heparin treatment because of the danger of retroperitoneal hematoma.

The success of the treatment is spectacular. Twelve cases of postpartum phlebitis were cured without any complications.

WERNER M. SOLMITZ, M.D.

NEWBORN

Rupture of the Liver in the Newborn. FELIX ARDEN. *Med. J. Australia*, 1951, 2: 632.

The author reports the cases of 6 newborn babies on whom the diagnosis of hepatic rupture was made. With one exception, all infants were postmature and oversized. Delivery by vertex presentation had been easy, with no evidence of serious trauma at birth.

After an average interval of 64 hours, symptoms of pallor, breathlessness, and occasional vomiting suddenly arose. On examination the babies were found to be in shock, with distended abdomens and signs of fluid.

Diagnosis depended upon recognizing that a massive internal hemorrhage had occurred. This was confirmed by low blood counts. In one instance a diagnostic abdominal tap was done and dark blood was obtained. Transfusions caused a dramatic response.

The lesions found at autopsy in 2 fatal cases, and at operation in 2 others were remrkably constant. Each had large quantities of blood in the peritoneal cavity, and a major portion of the capsule of the right hepatic lobe was elevated and torn by an underlying blood clot. Such findings are, of course, incompatible with life unless both diagnosis and treatment are prompt.

Of the 4 infants that survived, all were given blood transfusions. Vitamin K was administered in addition. In one case the liver was sutured at operation, but free bleeding recurred and was successfully managed with more blood. The author does not believe that laparotomy is necessary. In his opinion, three factors tend to bring the bleeding to an end: passage of time, the clotting capacity of donor blood, and increasing intra-abdominal pressure.

WARREN R. LANG, M.D.

MISCELLANEOUS

A Physiologic Study of Acute Renal Failure, with Follow-up Observations. LEON C. CHESLEY and WILLIAM H. MCCAW. *Am. J. Obst.*, 1951, 62: 1187.

Twenty-five cases of acute renal failure associated with pregnancy complications at the Margaret Hague Maternity Hospital, Jersey City, New Jersey, have been analyzed. This acute renal failure was precipitated by severe toxemia, abruptio placentae, shock resulting from hemorrhage, septic abortion, and blood transfusion reactions in sensitized RH-negative women. Abruptio placentae was the most frequent factor.

Eight of these patients died. The most common cause of death was found to be prolonged and irreversible shock.

In acute renal failure, the process appears to be that of renal ischemia with near cessation of the glomerular filtration as the initial factor, renal hypoxia which damages or kills areas of tubule cells, permitting back diffusion; and, later, tubular regeneration in which the poor renal function is due to the persistingly low blood flow and filtration rate, with the inability of the tubules actively to modify the glomerular filtrate in the normal manner.

Daily clearances of urea, uric acid, creatinace, and potassium demonstrated this. Diuresis antidotes recovery of concentrating power. Glomerular filtration is impaired for weeks. Normal values develop only over a period of months.

JOHN R. WOLFF, M.D.

Chorionepithelioma and Its Treatment (Sur le chorio-épithéliome et son traitement). M. PERRAULT, J. VIGNALOU, B. KLOTZ, H. SOULIGNAC, and H. P. CATHALA. *Presse méd.*, 1951, 59: 1348.

The frequency of chorionepithelioma and its rapid metastases are discussed. Only 20 cases of regression of pulmonary metastases have appeared in the world literature. The author refers again to his own patient, in whom the administration of paraoxypropriophenone was followed by regression of all manifestations of chorionepithelioma.

Diagnostic methods are reviewed, and the value of urinary hormonal assay is stressed as the only reliable criterion for diagnosis and follow-up. Recent therapeutic treatment with estrogens, paraoxypropiophenone, and thyroxin is discussed.

GERTRUDE J. VAN ECK, M.D.

GENITOURINARY SURGERY

ADRENAL, KIDNEY, AND URETER

Tuberculosis of the Urinary Tract. D. VAN CAPPELLEN. *J. Urol.*, Balt., 1951, 66: 619.

The author states that only 50 to 60 per cent of cure is obtained by nephrectomy even in carefully selected cases of unilateral tuberculosis, and the persistence of tuberculosis of the bladder, other genital organs, lungs, and bone have their part in the appreciable postoperative morbidity. These figures, advanced by other authors, are borne out by the personal experience of the author that nephrectomy for unilateral tuberculosis of the kidney does not restore every patient to a healthy life. Indeed, some authorities oppose early nephrectomy, but they watch the patient carefully, and as long as the function of the diseased kidney is good, nephrectomy is not performed; only when the function becomes poor, and the contralateral kidney has taken over the excretory function, is nephrectomy performed. The author uses "moogrol," a chaulmoogra oil preparation in combination with streptomycin. In addition, para-amino-salicylic acid is used because, in combination with streptomycin, the emergence of streptomycin-resistant bacilli is delayed. He uses sodium bicarbonate for alkalinization of the urine with 1 gm. of streptomycin, 20 gm. of sodium para-amino-salicylic acid and 1 c.c. of "moogrol" daily. He urges sanatorium care, in addition, to secure the best chance of obtaining a cure.

In the discussion, Lattimer states that the combination of PAS and streptomycin results in a retarded development of resistance to either drug. A long course of chemotherapy is needed, and he employs the PAS-streptomycin combination for a period of 1 year. The various new drugs, such as neomycin and thiosemicarbazone, are too toxic for clinical use. DAVID ROSENBLOOM, M.D.

The Adrenal Cortex and Rheumatoid Arthritis. EDWARD C. KENDALL. *Brit. M. J.*, 1951, 2: 1295.

In 1948, Philip S. Hench gave the Heberden Oration before the Heberden Society, London. At that time he was reluctant to describe the gratifying results which had been obtained in one patient with rheumatoid arthritis, in whom "compound E" had been used. For years, Dr. Hench had searched for the substance X which could bring about remission of rheumatoid arthritis.

With this 1951 Heberden Oration by the author, the results in thousands of patients in whom cortisone has been used can be reported. Cortisone may be the substance X so far as pregnancy is concerned, but the relationship between jaundice and rheumatoid arthritis still remains obscure. However, the message delivered by Dr. Hench—namely, that rheumatoid arthritis is reversible—will continue to gain in importance, for ultimately this fact will be concerned with the etiology and treatment of the disease itself. The subject, rheumatology, has come into its own.

Almost 20 years were required for the chemical phase of the investigation. During the first 10 years the chemical nature of the adrenal cortex was explored. Important work was done by the biochemistry laboratories of Professor Reichstein at Zurich, Switzerland, at Columbia University, New York, and by the author and his associates at the Mayo Foundation. By 1940 the 28 steroids separated from the adrenal gland had been divided into four groups. First were certain sex hormones, androgens, estrogens, and progesterone; second, were hormones found only in the cortex but physiologically inert; third, were 6 derivatives of delta^4 pregnene, all possessing physiological activity; and fourth, was an "amorphous fraction" exerting a strong effect on renal function (the chemical nature has not been established).

After the 6 crystalline compounds had been isolated, a more plentiful source had to be found. Several of the compounds were prepared in Professor Reichstein's laboratory, at the research laboratory of Merck and Company, and at the author's laboratory. The various steps in the preparation of the steroids have been so improved that the amount of starting material originally required for the daily maintenance of 35 patients will now furnish the same amount to 93 patients.

The production of cortisone by Merck and Company, and the decrease in cost are today important factors in the use of the hormone in clinical medicine; with further investigation, the price will be further reduced. Recently Professor Woodward and associates at Harvard, and Professor Robinson at Oxford have reported the total synthesis of the steroid nucleus, and the way is now open for the total synthesis of cortisone. Organic chemists have prepared 50 or more steroids closely related to cortisone so that it has been possible to determine the physiological significance of the various functional groups in the molecule. Finally, other chemists have devised tests for the determination of adrenocortical steroids in the blood and urine. These help to indicate the fate of cortisone and give some insight into the daily amount produced normally by the human.

Many physiological studies have shown the mechanism controlling the activity of the adrenal cortex and the influences affecting the gland through release of A.C.T.H. from the anterior pituitary body. The chemical action of cortisone has been found to be quite specific; its influence is shared by no other steroid except hydrocortisone. Many steroids have been tested, but no substitute has been found to date. The testing is unsatisfactory since the patient with rheumatoid arthritis, or some other responsive

disease, is the only possible test object; the psychic responses are, of course, involved.

Whether its (cortisone) effect is physiological or pharmacological can now be partially answered. Recent investigations by Venning, Mason, and Corcoran have shown that from 30 to 60 mgm. of corticosteroids may be excreted daily by a normal man. Since the total quantity of cortisone available is the sum of the amount produced plus the amount administered, and since the production of cortisone is suppressed by the administration of the hormone, the total amount available may come within the physiological range. Certainly, many patients with rheumatoid arthritis are notably relieved by a daily maintenance dose of less than 60 mgm. of cortisone. From the small amount of cortisone necessary for a remission of the symptoms of rheumatoid arthritis and from the irregular absorption rate of the parenteral hormone, it would seem that the normal human adrenal cortex can provide the necessary amount of hormones to provide protection during the latent or subclinical attack of rheumatoid arthritis. It would then appear profitable to determine whether failure on the part of either the adrenal cortex or anterior pituitary body is associated with symptoms of rheumatoid arthritis.

Rheumatoid arthritis is not an endocrine disease in the usual sense of the word. Although administration of cortisone can bring about a remission in the symptoms of rheumatoid arthritis, the results cannot serve as a basis for the hypothesis that a deficiency of the hormones of the adrenal cortex is the cause of the disease. The incidence of rheumatoid arthritis in the presence of Addison's disease is not significantly increased above that of a coincidental relationship. Another consideration is that of an alteration in the distribution of the constituents of the secretion of the gland; the amorphous fraction may be too large. This hypothesis does not, however, seem probable since the mineral metabolism, governed by the amorphous fraction, is not altered significantly in rheumatoid arthritis. Also, the rapid return of symptoms after stopping cortisone could not be due to a return of the activity of the hitherto suppressed cortex. Several days elapse before the gland resumes function. If some rheumatogenic agent were produced by the adrenal cortex, stimulation of the gland should lead to an exacerbation of the symptoms. This was one of the reasons why A.C.T.H. was administered to a patient with rheumatoid arthritis; stimulation of the gland, on the contrary, produced a remission of the disease. Since there are also good reasons to believe that the disease is not produced by an intra-articular bacterial infection or virus, other possibilities have been considered. The field of hypersensitivity and the phenomena associated with allergens, antigens, and antibodies have been explored. Cortisone can modify the effect of many chemical irritants and protein antigens, ranging from the reaction to beryllium salts to the response to tuberculin. It has not been established whether rheumatoid arthritis is caused by a foreign agent, as an antigen, but it is possible that cortisone could protect the tissues from such an agent; it could modify the rate of production of the antigen or the rate of production of an antibody, or could protect the tissue from the effect of the products formed by combination of the antigen with the antibody. Further work in this field may yield information concerning the etiology and treatment of rheumatoid arthritis.

Practically 100 per cent of patients with active rheumatoid arthritis responded in some degree to cortisone in a study at the Mayo Clinic. There was a wide range in the daily dose required to suppress symptoms, and 73 per cent received cortisone orally from the beginning. The daily dose of cortisone could be reduced more rapidly for those patients who had responded quickly to the suppressive doses. Eighty-six per cent of patients were maintained on 75 mgm. or less daily, and more than 50 per cent received 50 mgm. or less daily. Side effects developed in about half the patients but did not necessitate discontinuance of the drug. Many questions as to true etiology have remained unanswered as yet. The unexpected and far-reaching influence of cortisone on many diseases may be produced through its control of some causative agent which is common to all of them. Research will unlock the door to these secrets. NATHAN ROSENBLOOM, M.D.

Renal Trauma: A Study of 71 Cases. CLARENCE V. HODGES, DONALD R. GILBERT, and WILLIAM W. SCOTT. *J. Urol.*, Balt., 1951, 66: 627.

The authors present a classification of renal injuries which is of practical value in determining the indications for nonsurgical as opposed to surgical management. In the majority of instances, a particular case will be found to fall into one of three definite categories: (1) minor injury (contusion); (2) major injury; (3) critical injury.

Under "minor injuries" there has been parenchymal damage without rupture of the capsule or extension of the defect into the pelvis or calyces. There is no shock unless other structures are extensively injured. Hematuria, which might be alarming at first, subsides to microscopic proportions within from 48 to 72 hours. Pain, tenderness, and splinting subside. No mass is palpable (although a mass can be concealed by splinting). Pyelograms show an intact pelvis and calyceal system on the injured side; demonstration of this integrity of the hollow systems is the greatest criterion for placing injuries in this "minor" group.

"Major injuries" have parenchymal damage and capsular rupture with extension of the disruption into the pelvis and/or calyces. A palpable perirenal hematoma is commonly accompanied by evidence of urinary extravasation on retrograde pyelography. Physical examination may be very misleading in these cases. Excretory urography and, especially, retrograde pyelography which demonstrates extravasation places these cases directly into the "major" category.

An injury is termed "critical" when the disrupting lesion extends into the vessels of the renal pedicle. There is usually extensive pulpefaction of the renal capsule and perenchyma. The increasing mass in the exquisitely tender, splinted loin, along with early, profound shock and other evidences of massive hemorrhage furnish sufficient clinical information to attest to the severity of the lesion. Excretory urography is of value chiefly in determining the presence and adequacy of the kidney on the uninjured side. Retrograde pyelography is seldom found to be necessary.

In extensive injury, therefore, the policy of nonsurgical management has several major defects: (1) waiting may extend beyond the optimal period for surgical intervention, and some patients are lost (from hemorrhage) who might otherwise have been saved; (2) late complications, the sequelae of extravasation of blood and urine with subsequent infection, may arise, such as abscess formation, hydronephrosis and pyonephrosis, calcified hematomas and cyst formation, pyelonephritis and secondary hypertension, calculosis, and loss of renal function; (3) unassociated renal disease, underlying and contributing to the symptoms of renal injury, may go unrecognized unless all diagnostic measures are utilized; (4) patients treated nonsurgically often undergo a protracted convalescence and remain "renal cripples" for a long time.

In 71 cases the authors placed 47 (66%) patients in the minor group, 23 (32%) in the major group, and 1 (1.4%) in the critical group.

The authors believe that physical and laboratory examinations are often insufficient for accurate determination of the degree of kidney injury, and while excretory urography is valuable in demonstrating the presence of a normally functioning kidney on the opposite side, only retrograde pyelography will accurately delineate the extent of injury on the affected side. Concomitant administration of antibiotic and chemotherapeutic agents together with aseptic cystoscopy technique and the use of modern nonirritating contrast media render retrograde pyelography quite safe.

The authors believe that early surgery is definitely indicated in major injuries because of the high incidence and crippling effects of late complications, coupled with the increasing desire to conserve renal tissue whenever possible. After the initial shock, if present, has been overcome by supportive measures, a period of 48 to 72 hours usually ensues, during which diagnostic and surgical procedures can be carried out without the mitigating influences of infection, secondary hemorrhage, and general deterioration in the patient's condition. Proper surgical drainage, repair of parenchymal and collecting system lacerations, removal of devitalized tissue, and, if indicated, nephrectomy, are measures which, if carried out during this favorable period, find their justification in shortened convalescence and prevention of immediate and late complications.

DAVID ROSENBLOOM, M.D.

Sympathectomy and the Innervation of the Kidney. Z. M. EL ASFOURY. *Brit. M. J.*, 1951, 2: 1304.

The innervation of the kidney has recently attracted some attention because of its possible importance in the study of renal physiology and pathology, and more particularly in the study of the problem of hypertension. Recent work has shown that the kidney parenchyma has a rich innervation. De Muylder has shown that myelinated as well as nonmyelinated nerve fibers are present.

In this study, normal kidneys of fetal and adult mouse, frog, rat, rabbit, cat, and human were examined. Various methods of staining, including metallic impregnation and organic dyes, were used to stain nerve fibers and cells. Staining for reticulum was also widely used to compare results obtained by other staining procedures.

The kidney has a rich nerve supply running along the main renal vessels as they enter the hilum. The nerve fibers follow the branches of the vessels to their termination, supplying the tubules, glomeruli and pelvis along the way. The fibers vary in thickness and intensity of staining. Some are thick and irregular, running separately inside the kidney and appearing in thick plexuses around the blood vessels and glomeruli; other fibers vary in size and staining depth.

Groups of cells forming ganglia are present along the blood vessels inside the kidney; these vary in size and number of cells and are surrounded by synaptic formations. The renal papilla has a rich nerve supply and has ganglion cells. The author notes polyhedral cells lying directly on the walls of the capillaries inside the glomeruli; these send out filaments which wind around the capillaries and end on the nuclei of the papillary cells near their nucleoli. Between the renal tubules are the "interstitial cells." Some of these are polyhedral cells with fibers ending in certain of the tubule cells.

Subcapsular nerve fibers show the same variation in thickness and staining intensity as the deeper fibers.

Kidneys were examined after different methods of renal denervation at different stages of degeneration. Thoracolumbar sympathectomy was performed on the left side in two rats; the greater, lesser, and least splanchnic nerves were cut. The left sympathetic chain was divided at the level of the sixth thoracic vertebra and stripped down to the pelvis. All other fibers seen going to the kidney were cut. After periods of 3 and 8 weeks, the rats were anesthetized with ether and both kidneys were exposed.

In some cases the denervated kidney and blood vessels were larger than the opposite kidney and blood vessels; this probably resulted from the stimuli arising from the opening of the abdomen; in other cases the kidneys looked about the same. The tracheas were obstructed to produce anoxia. The intact kidney contracted to a smaller size and the cortex became mottled and wrinkled; the denervated kidney remained unaffected.

When these denervated kidneys were examined 3 and 8 weeks postoperatively, the nerve bundles were smaller and fewer than in the normal kidney. No thick fibers could be seen and no synaptic formation could be seen; the nerve ganglia thus looked less complex.

In conclusion, thick fibers which give "end feet" to the neighboring blood vessels are absent after thoracolumbar sympathectomy. The adequately denervated kidney is free from higher neuronal control. The variation in thickness and the staining reactions of the nerve fibers may be due to differences in function of the fibers. These may be either sympathetic or parasympathetic, preganglionic or postganglionic fibers, or visceroafferent fibers. The renal tubules and glomeruli are associated with polyhedral cells and receive a rich nerve supply. These cells may be nervous in character.

The possible relationship of the innervation of the kidneys to renal disease and perhaps hypertension should be further explored.

NATHAN ROSENBLOOM, M.D.

Implantation of the Greater Omentum in the Venous Drainage of the Kidney (Les greffes du grand épiploon dans le drainage veineux du rein). ABEL SAMPAIO TAVARES. *J. chir.*, Par., 1951, 67: 779.

Thirteen experimental animals (dogs) were subjected to ligation of the inferior vena cava (posterior vena cava in the dog) above the level of the offbranching of the renal veins. Only 1 of the animals survived. However, a second group of animals (14) was prepared in advance (7 to 19 days) by a nephro-omental implantation, and of these, 7 survived the high ligation of the vena cava. Of the 7 animals which did not survive, 1 died of purulent peritonitis and another of rupture of the kidney capsule. The surviving animals were sacrificed 4 days and 3 months, respectively, after the implantation. In every instance there was atrophy and sclerosis of the previously normal kidney and compensatory hypertrophy of the kidney previously subjected to nephro-omentopexy.

In 6 animals previously subjected to omentopexy the ligation of the vena cava was complemented by a sympathectomy. Three of these survived, but they did not exhibit a protective effect of the kidney which could be considered similar to that of the preliminary nephro-omentopexy alone.

Finally, in a series of 6 animals the author resected the renal veins of both kidneys and of the corresponding segment of the vena cava. All of the animals died within 72 hours, and the majority within 24 hours of the operation. At autopsy the renal congestion was bilateral and of extreme degree. The same operation was practiced upon 8 animals which had been subjected to nephro-omentopexy from 7 to 19 days previously. Of these the majority died within 72 hours, but only one-third of them died within 24 hours and 2 lived for a number of days. One of the 2 last mentioned animals died after 5 days with suppurative peritonitis and bilateral pneumonic lesions after the blood nitrogen had already begun to show signs of improvement in the uremic response. The remaining animal was sacrificed 7 days after the operation with evidence of marked uremic intoxication, however, with no worsening of the condition. Here again there was a marked difference in the macroscopic and histopathologic manifestations between the kidney subjected to preliminary omentopexy and the opposite kidney.

The author's experimental experiences thus tend to show that, no matter what the modus of venous congestion to which the kidney may be subjected, the macroscopic, clinical, venographic, and histopathologic findings concur in indicating the marked ameliorative effects of omentopexy.

JOHN W. BRENNAN, M.D.

The Differential Diagnosis Between Renal Tumors and Cysts. WILLIAM L. AINSWORTH and SAMUEL A. VEST. *J. Urol.*, Balt., 1951, 66: 740.

When simple renal cysts are strongly suspected from roentgenological and other findings, the authors have advised a simple office procedure to confirm the diagnosis. They simply insert a lumbar needle through the back into the cyst. The technique is similar to perirenal air injection but without the danger inherent with forcing air into vascular spaces. A plain roentgenogram of the patient is first obtained in the upright position, usually showing the relation of the mass in question to the lumbar vertebrae and the posterior crest of the ilium. With the patient then in the sitting position, novocaine is injected toward the center of the mass and along the lateral border of the sacrospinalis muscles. This is followed by the insertion of a lumbar needle, usually 18 gauge. There is a decrease in the resistance to the needle as it passes through the quadratus lumborum muscle into the perirenal fat. The wall of a simple cyst is usually fibrous and the point of the needle enters with unmistakable resistance. If the needle has entered the cyst, the end will go up and down on respiration. From 30 to 50 c.c. of fluid are allowed to escape from the cyst, and a similar amount of excretory contrast medium is then injected.

If a diagnosis of simple cyst is then confirmed, further management can be carefully considered and this need not be necessarily a surgical exploration of the cyst with excision or nephrectomy. The prescribed procedure has not inconvenienced a single patient and has been quickly and simply done in the office. In 20 odd cases this procedure has confirmed the provisional diagnosis of simple renal cyst with subsequent value in the management of these patients.

Surgical exploration for all space-occupying lesions of the kidney as an immediate necessity has been generally accepted as the method of choice in the management of patients with this condition. Ainsworth and Vest believed that exploration of the space-occupying renal lesion is either desirable or necessary in most instances of so-called solitary

cysts of the kidney, when the diagnosis can be confirmed. When symptoms of pain, discomfort, excessive hematuria or evidence of progressive cortical renal damage are present, then excision is in order. When excretory urography shows a relatively small amount of the renal cortex, having been rendered nonfunctioning by pressure from the cyst, and when no symptoms are present, the authors conclude that conservative management is indicated. They believe that the differential diagnosis between renal cyst and tumor is not a problem if due study is made of the kidney with a series of roentgenograms, both excretory and retrograde. They also take into account the appearance of the patient, the history, and the ability to palpate a mass in the kidney region.

The authors have suspected solitary renal cysts in some 20 odd cases, and in every instance they have "tapped" the cyst in which clear fluid has been withdrawn and in which there has never been a question of malignancy. Furthermore, the possibility of overlooking a malignant tumor associated with a renal lesion seems quite remote to them, for there does not appear to be any relationship between cystic changes in a malignant tumor and a thin, clear-walled cyst upon which the diagnostic procedure described in this article was used. The association between cysts and malignancy of the kidney is purely one of coincidence, and this chance occurrence is not enough to merit surgical exploration as the only recommended therapy in every case of cyst. The injection of contrast media into the cyst cavity would suggest that if a solid kidney tumor were present, a defect in the wall would be readily demonstrated. It is the authors' opinion that when a simple cyst of the kidney is suspected, the described procedure will prove to be more conservative and sensible than routine surgical exploration of the kidney.

CONRAD A. KUEHN, M.D.

Two Cases of Perirenal Tumor. A Contribution to the Statistical Material of Tumors of the Renal Capsule (Ueber zwei Faelle von perirenalen Tumoren. Ein Beitrag zur Kasuistik der Nierenkapselgeschwuelste). K. SICKINGER and G. SUCHOWSKI. *Zschr. Urol.*, 1951, 44: 605.

The first case reported was that of a 71-year-old male who was admitted to the hospital for cardiac decompensation. Palpation of the abdomen disclosed, beneath the left costal arch, a hard, insensitive, nodular tumor. A renal tumor was suspected. At autopsy, 14 days later, a hard, coarsely nodular tumor, the size of a small child's head was found in the region of the left kidney; in its upper pole it was contiguous to the spleen and in its medial border, contiguous to the spinal column; its lower pole reached below the level of the crista iliaca. When the tumor was removed from the cadaver, wedge-shaped infractions of the eleventh and twelfth thoracic vertebrae were found.

The tumor lay inside of the fascia renalis, although it penetrated the fascia at several points. Cross-section of the mass disclosed the caudally displaced kidney, completely enclosed by the neoplastic tissues. The kidney was nowhere invaded. Histologic examination led to the diagnosis of polymorphocellular sarcoma with a cell-rich parenchyma and meager connective tissue stroma.

The second patient was a 49-year-old asthenic woman who had attacks of nausea and dyspnea and a sudden increase in the size of the abdomen. At first she ascribed her symptoms to the approaching menopause; however, her family physician discovered a swelling and sent her to the hospital with the diagnosis of splenic tumor. Palpation disclosed a tumor beneath the left costal border. The mass presented a smooth surface and extended to the right to a point 2 fingerbreadths beyond the midline. Its caudal pole reached down into the pelvis major.

The urinary findings were essentially normal; however, the retrograde pyelogram led to the diagnosis of tumor of the left kidney. There was continuous filling of the (S-formed) ureter. The renal pelvicalycine system was depressed and rotated at right angles to its normal position. The superior calyx was elongated and markedly slender, but sharply demarcated.

At operation, upon opening the renal fascia, there was brought to light a massive tumor which had pushed the kidney downward but had left it intact. The tumor was the size of a man's head and had partially surrounded the inferior vena cava and aorta, but fortunately it could be separated. The mass was removed with the kidney on that side. The patient recovered without difficulty and 3 months later had put on weight and showed no evidence of recurrence or metastasis. An odd postoperative finding was a fall in the blood pressure from 195/90 to 115/75.

Histologically, the suprarenal gland was found to be somewhat drawn out over the surface of the tumor, but it was not invaded or otherwise involved in the tumor mass. The pathologist was unable to determine if the tumor was perirenal but took the surgeon's word that it was contained by the renal fascia; it certainly had not involved either the kidney or the suprarenal gland. The microscopic picture was that of a lipomyxosarcoma. There were cell-rich areas with, in the main, large coarsely grained cells containing fat in tiny droplets. The other areas consisted of a loose, hyalinelike connective tissue, with large spindle-shaped, or almost stellate, nuclei. In other places giant cells with single nuclei and some atypical mitoses were observed.

JOHN W. BRENNAN, M.D.

The Influence of Unilateral Nephrectomy on the Production of Experimental Arthritis in the Albino Rat. R. G. HARRISON. *Brit. M. J.*, 1951, 2: 1299.

Selye and others demonstrated the production of an acute monoarthritis or polyarthritis by repeated injections of desoxycortone acetate in rats subjected to left nephrectomy and given 1 per cent saline to drink. Other investigators were unable to reproduce

these results. Because of the discrepancy, it was decided to reinvestigate the problem. All of the techniques used previously could be controlled except that of the nephrectomy, and it seemed that the manner of performing this operation might be a possible cause of the discrepancy. This supposition appeared more likely since it was recently shown that interruption of an adrenal artery in the rat or rabbit results in an area of necrosis in the zona fasciculata of the cortex. In performing the nephrectomy the adrenal blood supply could inadvertently be injured. In the investigation, the adrenal arteries were deliberately interrupted during left nephrectomy.

Thirty albino rats were divided into three groups of 10 each. In group I a left nephrectomy was done, with careful avoidance of injury to the adrenal vessels. In groups II and III, all inferior adrenal vessels were removed with the kidney. All rats were given 1 per cent saline to drink throughout the experiment. From the fifth day after operation, groups I and II were given 2 mgm. of desoxycortone acetate crystals subcutaneously, twice daily. Injections were continued for 20 days, when all animals in groups I and II were killed. Individual rats in group III were killed at 3-day intervals following surgery.

Three rats in group II and 2 rats in group I developed arthritis. All of the arthritic rats in groups I and II had areas of necrosis of the left adrenal gland. At necropsy, it was noted that the inferior adrenal vessels of the rats in group I had become constricted by fibrous tissue resulting from the nephrectomy. All of the nonarthritic rats in group II showed areas of cortical necrosis, but they were different from the necrosis of the arthritic rats. The histological appearance of the arthritic joints was similar to that in the experiments of Selye.

The adrenal cortex of the arthritic rats was characterized by absence of cholesterol, and droplets of finely divided lipoid were scattered in the zona glomerulosa, zona reticularis and inner zona fasciculata. This is an appearance not encountered in the normal rat, and can be taken as characteristic of rats rendered arthritic by the technique used here.

The experiments suggest that a contributory factor in the production of arthritis in rats prepared as described is due to necrosis of the adrenal cortex restricted to the zona fasciculata. It has been reported by Mitchell and Angrist that focal necrosis of the adrenal cortex, due to a variety of infectious diseases, is mainly found in the zona fasciculata. The carbohydrate regulating steroids had secreted by the zona fasciculata and any necrosis of this area would cause dissociation of the normal relationships of glucocorticoid and mineralocorticoid secretion; this would be enhanced by repeated injections of desoxycortone acetate. This relationship provides an experimental rationale for the formerly rather empirical therapy of arthritis with cortisone.

It is difficult to apply the results of experiments unconditionally to the problems of arthritis in man. There are, however, various agents which could lead to diminished function of the zona fasciculata of the human adrenal cortex, and it is possible that a sustained vasoconstriction of the adrenal arteries could produce focal necrosis of the cortex. A further difficulty in applying to man these results in the rat is the apparent lack of absolute correlation of function with zone morphology in the human adrenal cortex.

NATHAN ROSENBLOOM, M.D.

Reinterventions in Renal Surgery (I reinterventi in chirurgia renale). S. PETKOVIC. *Urologia*, Treviso, 1951, 18: 313.

Sixty-five secondary operations on the kidneys have been performed during the past 6 years in 56 cases admitted to the urologic clinic of the Faculty of Medicine of Belgrade, Jugoslavia. There were 35 nephrectomies, 12 nephrotomies, and 6 pyelotomies. The remaining operations were plastic repair, denephropexia, lumbotomy nephrostomy, and an operation done for the extraction of a foreign body.

The principal indications for intervention, which was done subsequent to a primary operation, were: suppuration of the kidney or complete abolition of renal function in 28 instances, recurrence of a calculosis in 23 instances, tuberculosis discovered subsequent to the first operation in 26 instances, hemorrhage which was secondary to nephrotomy in 3 instances, and various other indications in 5 instances.

The mortality was 3 per cent (2 patients); however, neither of these patients died within 1 week of the secondary operation. This is a surprisingly low mortality, considering the difficulties and the complexities incident to the secondary intervention.

In nearly all instances the approach to the kidney followed the route of the original operation. The lower pole of the kidney is exposed first, or the operator started at the middle point of the convex border of the kidney and worked upwards or downwards by whichever route appeared the most easily accomplished as a start. The author prefers not to work subcapsularly since the capsule may later be needed to hold the stitches in cases of nephrotomy, or in conditions in which hemorrhage might be feared. It might not be necessary to expose the anterior surface of the kidney at all, and in this instance it would seem better not to disturb the powerful adhesions which, as a rule, remain from the previous operation. Where, however, the anterior surface of the kidney and renal pelvis must be exposed, it is always much easier to find the ureter and follow it up to the pelvis.

In loosening the upper pole of the kidney it may be advisable to cut the twelfth rib. Here the suprarenal gland must be given special attention. The great danger in mobilizing the upper pole of the kidney is that of interrupting the blood supply to the suprarenal gland. If this gland be injured in its functional capacity and the other gland be defective, or absent, the consequences may be serious. Two of the author's patients showed symptoms of hyposuprarenalism, and one of these died. The suprarenal gland should be separated with sharp dissec-

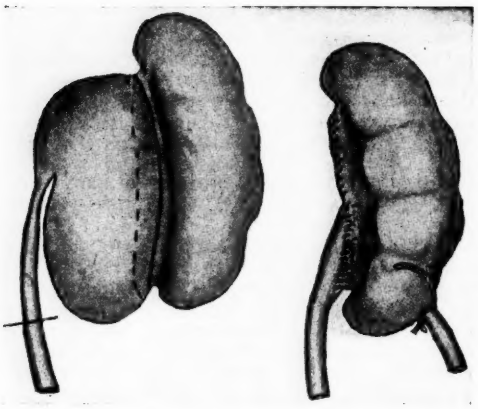

Fig. 1 (Forssmann). Total resection of the renal pelvis. a, Incision; b, Suture.

tion between the lower surface of the gland and the upper surface of the kidney. Blunt dissection brings with it the danger of lacerating or otherwise injuring the suprarenal gland. It is better to separate the capsule from the kidney subcapsularly than to risk injury to the suprarenal capsule itself.

An illustration in the original text shows how the fingers may be passed subcapsularly over the anterior surface of the kidney, and may press any calculus present in the renal pelvis backwards, to be removed through the posterior surface of the pelvis, thus avoiding disturbing the adhesions on the anterior surface of the kidney and pelvis.

In the presence of bothersome bleeding, the author may stop the operation and introduce a tampon until such time as the blood vessels can be grasped and tied; however, he does not leave the tampon in place as part of the postoperative dressing technique, but prefers capitonnage and closure of the wound.

In the author's material there was no instance of injury to the vena cava, although it is admitted that such danger is imminent, since the vena cava is apt to be drawn into dangerous locations by the adhesions in these patients. Other complications, such as tearing of the peritoneum, of the pleura, and (on the left side) of the hilus of the spleen are not excessively dangerous if proper precautions are taken against the dissemination of the products of suppuration. Danger to the liver is hardly to be anticipated. JOHN W. BRENNAN, M.D.

Terminal Result of Total Resection of the Renal Pelvis (Spaetergebnis nach totaler Resektion des Nierenbeckens). WERNER FORSSMANN. *Zschr. Urol.*, 1951, 44: 618.

The author prefers to designate the Hryntschak method of plastic operation on the renal pelvis as "subtotal resection of the renal pelvis," thus reserving for his own method the term "total resection of the renal pelvis."

With the author's method the entire renal pelvis, with the exception of about 0.5 cm. of the renal attachment, is removed down to and including the first part of the ureter in which the stenosis is nearly always located. The upper part of the dehiscence, represented by the cut edges of the pelvis, is closed by interrupted catgut sutures. The upper end of the ureter is then split longitudinally and sewn in a long oval to the remaining unclosed portion of the original dehiscence. Beginning at the deepest point of the incised end of the ureter a suture is introduced and carried to the lowest point of the unsutured edge of the pelvic wall. The cranial end of the ureteral incision is made somewhat rounded or pointed and this end is attached to the upper end of this same unsutured pelvic wall. The intermediate points are sutured in order (Fig. 1b). Then the transrenal renal pelvic drainage of Ringleb-Heusch is used (a couple of strips of gauze are left in the bed of the wound) and the rest of the incision is closed in 4 layers.

The author has now operated by this method on 2 patients with hydronephrosis. The first was operated on in 1936. The sac had to be loosed from the blood vessel packet leading to the lower pole; nevertheless, the operation was successfully completed; the patient was later followed up for 3 years.

The second patient, a 25-year-old male, was operated on in 1938. The operative result was then followed up, with two descending pyelographies, for about 18 months. In 1940 the patient became a soldier, but in 1950 he returned and was again subjected to a thorough examination, including, again, a descending pyelography. Functionally, the operative kidney was still somewhat inferior to the normal kidney; the kidney and new pelvis were somewhat tipped anteriorly on the long axis. However, the morphologic appearance of the organ had not changed and the patient asserted that he had been well during the entire period of his absence, even engaging in strenuous physical employment during his military service.

Although the author does not claim that his method is the only one which should be used, he thinks that some form of plastic operation should be used in these instances of hydronephrosis, especially in young individuals. That the danger of postoperative stenosis of the sutured end of the ureter is not serious is exemplified by his first patient who passed a pea-sized urinary calculus through the anastomosis 7 weeks after the operation.

It is admitted that failures will occur. Just recently the author had to remove a kidney 2 weeks after the operation. The kidney no longer functioned and penicillin and streptomycin were unable to control the infection. Nevertheless, despite such misfortunes, which are unavoidable, the pres-

ervation of hydronephroses which show a prospect of recuperation of the renal function should be given more consideration than has been the case in the past. JOHN W. BRENNAN, M.D.

BLADDER, URETHRA, AND PENIS

The Treatment of Stone of the Urinary Bladder (Die Behandlung von Blasensteinen). HEINZ STRAUSS. *Zschr. Urol.*, 1951, 44: 695.

In this communication the capacities of lithotripsy are outlined in the guise of 5 case reports selected from the vast material of the urological department of the spa, Bad Wildungen, in Germany.

The first report concerns a 50 year old male who had suffered for 24 years from a bladder stone which had continually increased in size. When the lithotriptor was introduced and had grasped the calculus, it was found that even the Thompson lithotriptor was so extended by the size of the stone that sufficient force could not be developed by the instrument to crush the stone. This latter was finally broken by striking the long arm of the lithotriptor with a hammer, the stone being then easily broken up and removed with the aspirator.

The second patient was a 76 year old male who had been unable to urinate spontaneously for years because of a huge prostatic adenoma. Several phosphate stones had formed in the posterior pouch produced by the enormous protrusion (in front) of the prostate. There was a question as to whether these concretions could be reached. However, with the smaller, more compact, Thompson lithotriptor the membranous urethra proved sufficiently mobile to permit of removal of the stones without difficulty.

The third patient was an 82 year old male who was not well enough to make the trip to the author's institute (Bad Wildungen), and who had been refused a requested attempt at lithotripsy by a nearby university clinic. The author made the trip with his assistants and his instrumentarium and did the lithotripsy in the patient's bedroom without the slightest difficulty. A telephone call from the institute the next day caught the patient back at his desk, at his factory.

The fourth patient was a 59 year old male who previously had had a bladder stone removed at another clinic by suprapubic cystotomy. Eight months later a second stone, larger than the first, had formed. This was removed easily by lithotripsy without recourse to a second opening of the abdomen.

The fifth patient was a 61 year old male with a walnut-sized stone in the urinary bladder. After three sessions with the cystoscopic lithotriptor, about one-fifth of the stone had been removed. The patient then sought a more rapid method of relief from his sufferings. The Thompson lithotriptor was brought into action and had cleaned out the bladder in 20 minutes' time.

The experiences of the author, as partially depicted in the cases here reported, have convinced him that the suprapubic cystotomy cannot be regarded as the operation of choice for the removal of stone from the urinary bladder. He is also convinced that the cystoscopic lithotriptor, even in the hands of a skilled and experienced operator, cannot compete in results with the instrument of Thompson. Even the extreme difficulties of learning how to use the so-called "blind method," in which there is only the sense of touch, will be overcome in the interest of the patient. Salus aegroti suprema lex! The author does not believe that the cystoscopic lithotriptor, dazzling as is its "trick photography," is able at present to supersede the "blind method."

JOHN W. BRENNAN, M.D.

Priapism in Sickle Cell Anemia. J. H. CAMPBELL and SAM D. CUMMINS. *J. Urol.*, Balt., 1951, 66: 697.

During a period of 10 years, 102 male negroes at the Shreveport Charity Hospital were found to have sickle cell anemia. Five of these had priapism as their chief complaint and are reported in detail. Only 16 similar cases were found in the literature.

The ages of the patients in the authors' series varied from 5 to 33 years. None of these 5 patients gave any history of local trauma.

The pathogenesis of the priapism remains unknown, but the popular theories are reviewed. It was observed that the corpus spongiosum was not involved in this small group. Histologic study of the corpora cavernosa was made in one case and failed to show any thrombosis.

Recommended therapy consists of multiple small blood transfusions, necessary sedation, and hot compresses. Although only 3 of the 5 patients could be followed clinically, 2 denied any impotence 8½ years and 4 years after their acute attacks. The one patient whom the authors treated by aspiration became impotent. This complication was mentioned in only 6 of the similar cases gleaned from the literature. These patients had been treated by aspiration or incision of the corpora and all 6 became impotent. The authors believe that there is a direct relationship between surgical interference and subsequent impotence. ORMOND S. CULP, M.D.

GENITAL ORGANS

Prostatic Adenectomy by the Right Coccygoperineal Incision (L'Adénomectomie prostatique par voie coccy-périnéale droite). R. COUVELAIRE and J. R. BOUFFARD. *J. urol. méd., Par.*, 1951, 57: 362.

The authors present their technique and results of coccygoperineal prostatectomy.

In 1893, Schede and Sick used the sacral approach of Kraske to remove the seminal vesicles. In 1911 Voelcker described the ischiorectal incision and used it for the removal of prostatic carcinoma. Rochet and Goetze in 1919 and 1937, respectively, studied the sacral incision for operation on the lower ureter for the removal of ureteral calculi. Thiermann suggested this approach for total nephroureterectomy in the removal of the lower portion

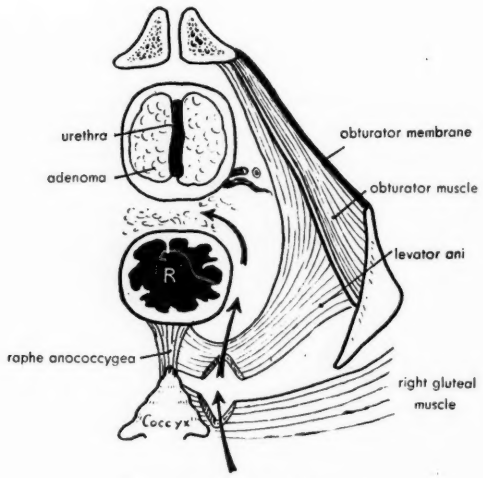

Fig. 1 (Couvelaire, Bouffard).

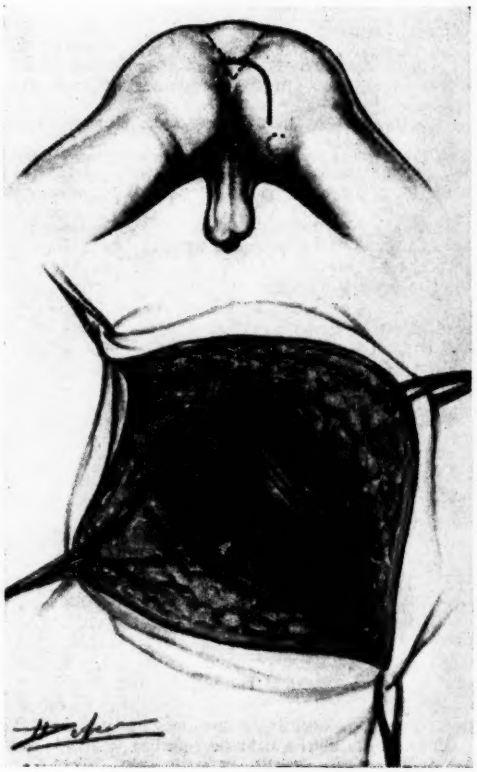

Fig. 2 (Couvelaire, Bouffard).

of the ureter. Defoort in 1941 used the coccygoperineal incision for the removal of a vesical diverticulum. The authors used this approach also in the removal of a vesical diverticulum, and the procedure is described in this article.

P. Fabre, at the French Congress of Urology in 1950, praised the parasacral incision for the removal of enlarged prostates and cancer of the prostate that can be removed.

The authors' operative technique is as follows:

The patient is prepared for surgery with a cleansing enema. The rectum is not sutured with an encircling suture because it does not permit the escape of gas from the bowel and therefore causes distention, nor is the operator able to introduce a finger into the rectum during the operation. The authors stated that in their opinion the low spinal type of anesthesia or perhaps epidural anesthesia seems to work best for this operation because the ventral decubital position does not permit easy intubation.

The cutaneous incision extends between the bony landmarks on the superior aspect of the sacrococcygeal articulation, and inferiorly to the right ischial tuberosity. The incision is from 10 to 12 cm. in length according to the anatomy of the patient. It is curved, with a short horizontal part between the sacrum and the coccyx and a vertical part extending downward to about 2 fingerbreadths from the right ischial tuberosity. The angle joining the two limbs of the incision forms a gentle curve. The incision is deepened to the aponeurosis of the gluteal muscles on the posterior inferior border. Next the coccyx is disarticulated and the lateral side of the coccyx, the fibers of the posterior inferior aspect of the gluteus maximus, the ischiococcygeal muscle, and the sacrosciatic ligaments are exposed. This maneuver merits care because of the proximity of the rectum. The coccyx is seized by a hemostat and retracted to the left and subsequently removed; this allows for the exposure of the full depth of the incision on the left side. The incision now is bounded by the last segment of the sacrum above, by the right gluteal muscles on the right, by the anococcygeal raphe on the left, and by the posterior border of the levator ani muscles below.

After the osseous removal of the coccyx, the right side of the rectum and the deep perineal aponeurosis are incised by the electric bistoury. The left index finger is inserted into the rectum in order to facilitate the dissection of the rectum from the surrounding tissues and thus expose the anterior surface of the bladder and prostate gland.

The internal border of the gluteal muscles and the ischiococcygeus muscle are separated from the fat of the ischiorectal fossa; thus, a hollow is formed by the two levators and below by the anococcygeal raphe. A 2 or 3 cm. incision is made into the inferior border of the right levator ani muscle. In

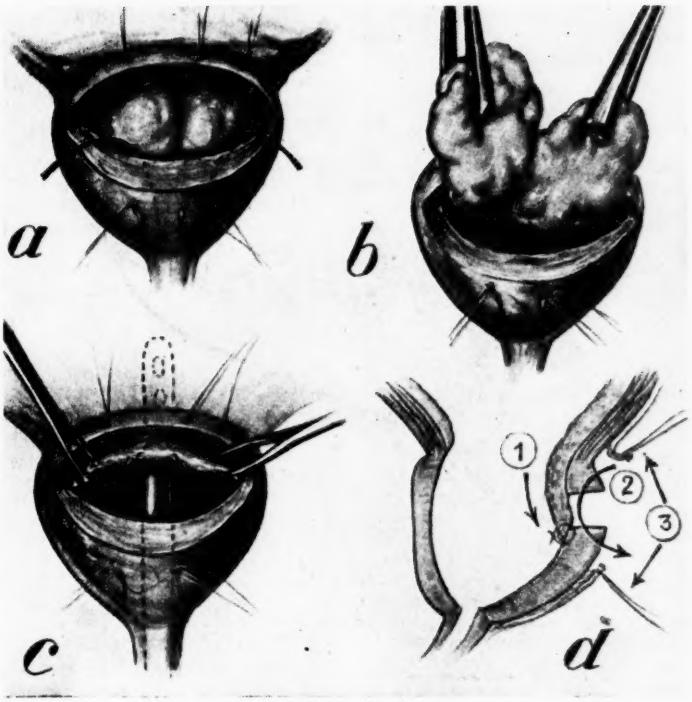

Fig. 3 (Couvelaire, Bouffard).

this manner the approach to the prostate is opened. The rectum is retracted to the left side of the incision by a special retractor pictured in the article. The finger must identify the posterior surface of the enlarged prostate. Above the prostate is Denonvilliers' fascia, concealing the posterior surface of the bladder and the differential triangle. Usually from four to six ligatures, that is, a double layer with 2 or 3 in each side, are placed in the prostatic capsule to control the bleeding when the incision is made. The incision into the prostate gland is usually made high on the superior limit of the base of the prostate. The electric bistoury is used to make the incision, usually 3 cm. long. The depth of the incision into the prostate must vary with the thickness of the posterior capsule. The actual removal of the prostate gland is carried on as it is in the retropubic technique. The inferior pole is first dissected free and sectioned from the urethra with the scissors. The prostate is then enucleated with the finger and removed by lifting out the dissected enlargement with an instrument. There are usually two lateral vascular pedicles that are grasped with a clamp and coagulated. The index finger then explores the bladder to determine the presence of calculi and to catch the posterior layer of the vesical margin. Between two Allis clamps the bladder neck is easily brought to the surface of the capsule and a resection of the thickened bladder margin can be made. Hemostasis is accomplished by two catgut sutures, one on each side; these are left long. The long sutures are placed into the deep inferior leaf of the incision to form a mucous curtain which permits easy catheterization and helps to control hemostasis. A large catheter is introduced through the penis into the bladder and adjusted so as to provide the best place for vesical drainage. The closure of the incision into the prostatic capsule proceeds with a second layer, the first being the one in which the mucous membrane of the vesical margin is brought to the inferior posterior layer of the incision. The second layer of closure is formed by the thickened layers of the prostatic capsule, and they are brought together with No. 1 chromic catgut sutures. At times it may be possible to form a third plane of suture by using the cellular tissues on the surface of the prostate gland. The rest of the incision is closed in a routine manner. The two gluteal muscles are resutured. The levators are replaced to their point of insertion into the coccyx. The skin is closed in the usual manner with a rub-

ber wick for drainage. After the incision is closed, the catheter is fixed in the best position for drainage and the bladder is lavaged until the drainage is clear.

Postoperative care entails the use of 500,000 units of penicillin and 1 gm. of streptomycin each day for a week. The rubber drain is removed on the third day. The stitches are removed on the twelfth day. If the urine is clear, the large-sized catheter is replaced by a smaller one, care being taken to adjust the catheter to provide adequate bladder drainage. This catheter is usually removed on the twelfth day. If the wound is watertight, the catheter is put back for 2 nights and then removed permanently.

The authors have used this operation on 12 patients. Of the 12, 3 died. The 3 who died were more than 75 years of age. One had a cystotomy for many months prior to the operation and a large, infected diverticulum. The second died 3 days after surgery because of cardiac failure and pulmonary infarction. The third patient died on the sixth day from paralytic ileus after an immediate normal postoperative course. From a functional point of view, one patient had temporary nocturnal incontinence that disappeared in about a month. Another patient had persistent polyuria, but the dysuria which had been quite intense prior to surgery disappeared. The other patients showed excellent functional results, and the operation was considered to be eminently successful.

CONARD A. KUEHN, M.D.

The Technique of Prostatectomy (Zur Technik der Prostatektomie). F. GAERTNER. *Zschr. Urol.*, 1951, 44: 684.

Since August, 1943 the operation employed for prostatic hypertrophy has been the suprapubic prostatectomy with primary closure of the bladder according to the technique of Harris-Hryntschak. Up to the end of 1948, over 800 patients were operated upon in this manner. The results were reported in *Zeitschrift für Urologie* at that time. To this number are now added 280 prostatectomies performed at the First University Surgical Clinic, in Vienna, and 43 additional prostatectomies on patients seen in private practice in other hospitals, making a total of 1,123 suprapubic prostatectomies with primary closure of the bladder incision.

In this material there were 62 deaths (5.5%). The causes of death were ascending infection, pyelonephritis, and uremia (25 cases), massive pulmonary embolism (14 cases), suppurative pneumonia following pulmonary infarction (6 cases), cardiac deaths postoperatively (3 cases), retrovesicular abscess following perforation of catheter (1 case), and deaths from suicide, sarcoma hepatis, encephalomalacia, rupture of an aortic aneurysm, (13 cases).

In the 1,061 patients who survived the suprapubic prostatectomy, the average onset of spontaneous urination was 12½ days. In two-thirds of these patients the catheter could be removed before this time and the patients were regarded as completely healed. The average period from the day of operation until the patient was discharged varied for the different years, from 17 to 26 days. The period of residence in the hospital was notably influenced by introduction of the purse-string suture in the bladder closure.

In 1950, two parallel series of patients were studied, one series having the ordinary linear closure of the bladder, the other the purse-string closure. In the former group, 25 patients left the hospital within 10 to 13 days after the operation, 22 left within 14 to 16 days, 17 left within 17 to 20 days, and 27 left after 21 days or longer. In the latter group the corresponding figures were 24, 12, 7, and 9 patients. These figures render the advantages of the purse-string suture method obvious.

The manner in which it has been attempted to improve on the original Harris-Hryntschak method is as follows: The bed of the prostate is no longer tightly sutured over a Tiemann catheter; a hemostatic effect is attempted by the application of two Z-sutures to the posterior circumference, and the bed of the prostate is narrowed by means of two transverse sutures (interrupted or mattress).

Since December, 1949 a balloon catheter has been used. At first the catheter used was the Foley catheter; later Ruesch manufactured a catheter with a larger balloon. This catheter not only filled the prostatic bed but also extended through the cervical neck into the lumen of the bladder itself, assuring residueless drainage. Earlier removal of the catheter was also attempted (on the sixth postoperative day).

Streptomycin has been introduced into the preoperative and postoperative treatment of these patients only recently. The time of healing is believed to have been essentially shortened with the use of this antibiotic. Penicillin has been used concurrently; it is believed that the association of suronal would be better but, unfortunately, this drug is unavailable at present. Of the 32 patients operated upon under streptomycin protection, there has not been a single instance of urinary fistula, even of the temporary wetting of the abdominal dressings which was formerly so common. This result is ascribed largely to the absence under this treatment of incrustation and necrosis. JOHN W. BRENNAN, M.D.

A Return to Transvesical Prostatectomy. Notes on a Personal Technique (Ritorna alla prostatectomia transvescicale. Note de tecnica personale). GUIDO BOEHM. *Urologia*, Treviso, 1951, 18: 322.

Wishing to secure the advantages of the prostatectomy of Freyer, without losing the surgically excellent and aseptically admirable characteristics of the Millin technique, the author has been developing and using during the past year a technique which he considers satisfactory and which he hopes will gain sufficient adherents to be given, at least, a fair trial.

The initial incision is made longitudinally above the pubis and passes at first only through the skin and subcutaneous tissues. It is about 10 cm. in length. The lower corner of this wound is then dis-

placed downwards and laterally, first to one side and then to the other, so as to uncover and resect the vasa deferentes at their points of egress from the inguinal canal on each side. The incision is then extended downwards through the linea alba to the reduplicature of the peritoneum. This fold is then raised so as to uncover the anterior surface of the bladder, without, however, entering the cave of Retzius or the two lateral pockets between the pubis and the neck of the bladder.

The bladder is now punctured, the boric acid fluid which was previously left in the bladder is withdrawn, and the bladder is opened by means of an ample incision. This incision is sufficiently large to permit of ample view of the ureteral orifices and the internal urethral orifice, or the bulging masses of the prostatic adenoma, as the case may be.

An incision is made with a bistoury, encircling the internal urethral orifice and extensive enough to include the intravesicular masses of prostatic adenoma, but sparing as far as possible the internal urethral sphincter. The incision is deepened with the diathermy knife, although the actual delivery of the prostatic tumor is accomplished by blunt dissection. The adenoma is totally freed before the urethra is cut at the lower end of the tumor.

The indwelling catheter is now introduced and, after the bleeding has been carefully controlled, the bladder is closed in the usual manner with two rows of interrupted sutures. The stitch at the upper end of the cystotomy is carried through the abdominal walls, fixing the bladder at this point to the muscular walls of the abdomen. After sulfonamide aspersion, a drain is led down to the subcutaneous tissues and left in place for 24 hours. The wall of the abdomen is otherwise entirely closed.

The author has now used this method of operation on 17 patients and is perfectly satisfied with it. The method gives a sufficient view of the operative terrain so that the fault imputed to Freyer's operation (of being a blind procedure) is obviated. There is no interference with the striated muscular sphincter and very little interference with the smooth muscle sphincter. Bleeding is reduced to a minimum. The permanent catheter is withdrawn on the seventh postoperative day, the patient is gotten out of bed on the eighth day, and goes home the ninth or tenth day. Five of the author's patients were more than 70 years of age and these required the least care of any. Of course, preparation of the patient, with administration of penicillin, sulfonamides and streptomycin, is rigorous. JOHN W. BRENNAN, M.D.

MISCELLANEOUS

Renal Endometriosis. A Study of the Origin of the Metaplastic Endometrium (Endométriose rénale Contribution a l'étude de l'origine métaplasique de l'endométriose). LOUIS FRUHLING and EUGÈNE BLUM. *J. urol. méd.*, Par., 1951, 57: 151.

Renal endometriosis is characterized by the presence of tissue morphologically and physiologically identical with that of the mucosa of the uterus, the kidney being one of the rarest of all the extrauterine sites of endometrial transplants.

The first observation of this condition was made by Wells in 1940. He inadvertently found a small nodule of endometrium in the kidney of a woman who had died of ovarian cancer.

The first case of renal endometriosis was reported in 1943 by Marshall. His patient, a 40-year-old woman, had a large, painful mass in the left flank. During the 16 months that this condition had been noticed before hospital admission, the mass was at times tender and painful but there was no relationship of this symptom to the menstrual cycle. The left kidney function was found to be poor, and on further examination the left renal outline appeared to be enlarged with a marked deformity of the upper pole of the kidney. A left nephrectomy was done. The kidney weighed 100 gm. and contained a large cyst that was filled with blood. Histological examination of the kidney revealed typical endometrial tissue with a small amount of associated smooth muscle. Marshall thought that the lesion resulted from the inclusion of early primordial muellerian cells in the metanephros.

Maslow and Learner, in 1950, reported the second case of this condition. Their patient was a 29-year-old woman who had intermittent hematuria for 3 months. The woman's menstruation was normal. The hematuria had no relation to menstruation and was not cyclic. The urological study showed a cystic dilatation of the upper pole of the right kidney. The right kidney was removed. The gross specimen showed multiple cysts containing a chocolatelike material. Microscopic examination showed the classical picture of endometriosis with a large area of fibromuscular proliferation and scattered glands formed by columnar epithelium. There was no anaplasia. The authors thought that the endometrial metastasis would account for the pathological findings in this case.

The third case reported in the literature was that of the authors. Their patient was a woman 42 years of age who had right abdominal and lumbar pain for 3 years. These pains were more severe during the menstrual period. The patient developed acute pain in the right side of the abdomen, and on surgical exploration a congested appendix was found. An ovarian cyst as large as an apple was removed as well as the appendix. The fallopian tubes were normal and were not removed.

On examination the ovarian cyst contained old endometrial tissue.

The patient's menstrual periods were normal following the operation, but she continued to have pain in the right flank and inguinal region, and at times the pain was generalized throughout the abdomen. There was polyuria but no hematuria. A urological examination revealed diminished renal function on the right side. The left kidney function was normal, however. The retropyelographic study showed extreme atrophy of the right kidney. On the basis of

these x-ray findings, exploratory lumbotomy was done. An atrophic right kidney was easily removed. The kidney was quite small, measuring 4 by 1.5 by .7 cm., and it weighed only 14 gm.

Histological examination of the kidney removed at operation showed the presence of an advanced, chronic pyelonephritis. There were sections which showed the presence of tissue that was morphologically typical of endometrial tissue. Some sections also showed a physiological reaction with glandular formation containing intraluminary hemorrhage.

From a theoretical point of view the origin of endometrial tissue in the kidney can be either from (1) cells with definite muellerian potentialities which might separate from the site of the forming muellerian tubules and become attached to the uteric bud of the metanephrogenic blastema and thus be included within the metanephros (dysgenetic theory); (2) endometrial tissue "grafted" upon the renal parenchyma from some other organ (the endometrial tissue found within the kidney would then represent a metastasis from a tumor elsewhere—"exogenous theory of origin;" and (3) the cells within the metanephros, which could have variable potentialities—the muellerian potentialities would develop in a small portion of the kidney (the metaplastic theory).

A morphological study of the sections in this case revealed endometriosis, and showed the existence of a metaplastic process which progressively transformed the renal elements "both secretory and excretory" into endometrial tissue. This transformation of renal epithelium into endometrial epithelium was at first a metaplastic process, transforming the urinary tubules into a glandular form. A second process then took place in which there was a metaplastic transformation of the glandular tissue into cytogenous stroma and smooth muscle fibers similar to those of the endometrium.

In the authors' case there was a close association between renal atrophy and the endometriosis. Was the atrophy the result of the development of the endometriosis? The authors believe that the development of the renal atrophy occurred before the development of the endometriosis. The renal atrophy was due to the result of an ascending inflammatory process. The chronic inflammation of the renal tissue existed then for a long time with subsequent loss of renal function and progressive atrophy. These changes in the normal kidney tissue due to infection predispose to metaplasia. The second factor in this change from the renal atrophic epithelium to the typical endometrial tissue was thought by the authors to lie within the field of endocrinology.

The authors discussed the third case of renal endometriosis recorded in the literature. The histological study of this kidney removed at operation showed a metaplastic process transforming the areas of secretory and excretory renal elements to typical endometrial tissue. The progressive transformation of the normal renal epithelium was due to a metaplastic adaption to smooth muscle and cells resembling those found in the endometrium. The morphogenetic factor of the renal endometriosis also lies within the field of endocrinology as this patient had undergone previous removal of an ovary which contained an endometrial cyst.

CONRAD A. KUEHN, M.D.

The Pedicled Ureteral Plastic in Hypospadias (Gestielte Ureterplastik bei Hypospadia). MAX BIEBL. *Zschr. Urol.*, 1951, 44: 657.

During the years from 1946 to 1948, the author has had occasion to operate upon 3 young patients with hypospadia penis. In these he used a ureteral transplant. Essentially the operation consists in nephrectomy with the use of its ureter. This muscular organ is carefully skeletonized as far as the small pelvis and brought to the anterior wall by means of a canal, bored through the subcutaneous tissue; here the ureteral tube is brought out through a puncture hole into the subcutaneous tissues of the anterior abdominal wall, the emergence being effected near the anterosuperior spine of the ilium, and then conducted subcutaneously to a point near the navel.

In these 3 patients the penis was subjected to a preliminary suspension; that is, it was brought up to the region of the navel and incised dorsally in a longitudinal direction, and the edges of the skin were stitched to the edges of skin of a corresponding incision in the anterior wall of the abdomen (ventropexy) and permitted to heal in place.

Another preliminary measure in these 3 patients was the provision of a counter-drainage opening from the perineum into the urinary bladder. This was to permit of a better asepsis in the region of the opening to be repaired, and to combat any tendency towards ascending infection in the direction of the residual kidney. In these 3 patients the organ sacrificed was the right kidney. The right organ was selected for sacrifice because of the fact that the greater length of the left ureter was not considered necessary in these instances, and the left kidney is less exposed to the possibility of future trauma.

After these preparations had been completed and the ureter had been conducted to the point near the apex of the suspended glans penis, the end of the ureter was brought out through the skin and conducted down through the shaft of the penis through a route bored quite close to the under surface of the penile shaft, as far as the hypospadic opening. Here, if the ureter proved long enough, it was brought out through this opening and an excess of 2 or 3 cm. was left in place.

After the transplanted ureter had healed (in 2½ to 3 weeks), it was cut loose from its central attachment. The end protruding through the hypospadic opening was also trimmed down so as to meet the proximal stump of the penile urethra coming from the bladder, and the urinary passage at this point was allowed to heal over a catheter by a secondary healing process, without stitching. This method is, of course, anything but ideal; in fact, the author doubts that the fitting and stitching of the small lumened and delicately-walled ureter to the rela-

tively huge urethral opening can be satisfactorily accomplished. He does suggest, however, that inclusion of the expanded funicular portion of the upper end of the ureter and lower portion of the renal pelvis, or that ligation of the ureter prior to the extirpation of the kidney, so as to cause the lumen to become dilated, might solve the problem.

The author specifically warns against the employment of tissues (in addition, of course, to the muscular walled and adaptable ureter) other than those of the prepuce or scrotum in plastic repairs to the penis. Such other tissues are apt to form a rigid, shrinking, penile strut which will later tend to interfere with the sexual (erectile) functioning of that organ.

The one-sided nephrectomy was well borne by these 3 patients, 2 of them mere children, the other a 16 year old youth. An odd incident in two of these patients was the formation of a bladder concretion during the period of their stay in the clinic. In none of these 3 patients was penicillin used; moderate sulfonamide treatment was given the 16 year old youth during two attacks of pyelitis. In all 3 patients the excess of ureter left on the end of the glans from the cutting of the ureteral stump, or pedicle, was trimmed down to form a neat orificium externum of the new urethra.

The final result with reference to the qualities of the new urethra and of the power of micturition in one of the 2 children and in the 16 year old youth, is excellent; the initial tendency to stenosis at the point of secondary ureterourethral anastomosis has been overcome and there is in each an ample stream of urine with urination. In the other child the stenosis at the ureterourethral junction has not as yet been satisfactorily dilated, while the rest of the new urethra has responded perfectly to the dilating sounds. The explanation of this recalcitrance on the pait of the stenosis at the junction is given by the author as a result of the fact that there was in this instance no excess length of ureter at the hypospadic opening, so that the new urethral end terminated during the healing process at the edge of the opening.

The author admits that the technique and proposals for future improvement are incomplete and leave many problems unsolved; however, he believes that with the present communication he has made a start in the direction of a solution of the great problem of the discrepancy between the old methods (with their insistence upon correction of the faults of urination) and what ought to be striven for with reference to the future functional sexual activities of the penile organ. JOHN W. BRENNAN, M.D.

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SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS

CONDITIONS OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC.

Calcinosis. A. R. HAMILTON. *J. Bone Surg.*, 1951, 33-B: 572.

Calcinosis may be defined as that condition which is marked by the deposition of calcium salts in nodules under the skin, in muscles, tendons, and nerves. It is commonly described as of two types, namely, calcinosis universalis and calcinosis circumscripta.

Calcinosis universalis frequently affects children, the youngest child, of the cases reported, being 5 weeks old. The condition is widespread throughout the body, is often associated with scleroderma and sclerodactylia, and may be fatal. The flexor aspects of the limbs are more likely to be affected, and the fingers usually escape.

Calcinosis circumscripta usually affects older people and is often confined to the terminal phalanges of the fingers and the extensor aspect of the elbow and the knee. Females are more frequently affected than males. Peripheral vasomotor disorder and Raynaud's disease are commonly associated with calcinosis. Sometimes the skin over the calcium nodules ulcerates and a cheesy purulent material exudes. Many theories as to the etiology of the disorder have been enunciated but none has yet been proved. The general consensus is that calcium metabolism is not disordered.

The author suggests the term of "calcinosis localisata," to distinguish several cases (which he reports) of the localized type of calcinosis from the more widespread type of the disease. He presents 13 cases of calcinosis localisata. In 5 of these the lesion was situated about the greater tuberosity of the humerus; in 1 case, in the axillary aspect of the shoulder; in 1, in the dorsum of the foot; in 2 cases, in the digits of the hand; in 1 case, on the dorsum of the wrist; in 1, in the region of the flexor carpi ulnaris tendon; in 1, on the lateral aspect of the elbow; and in 1, on the tip of the greater trochanter.

In general, the cases were all characterized by (1) intense pain and tenderness at the site of the lesion; (2) absence of any other clinically obvious area of calcinosis; and (3) complete absorption of the calcium, after rest in some cases and after incision in others. No doubt, those treated by incision would have responded to rest equally well, although not so rapidly.

As to the etiology of this localized calcinosis, the author believes that two factors must be considered: (1) impairment of tissue vitality by some injury or pre-existing pathological condition and (2) infection by some hematogenous organism or toxin. The condition can be either insidious or acute in onset. In some cases there is increased local temperature in the shoulder, and at first the patient may have a fairly high temperature, as high as 101 degrees F., as well as an increased pulse rate. The article includes interesting radiographs which show the respective deposits of calcium in the 13 cases reported. With regard to the shoulder cases, it may at times be difficult to state whether the calcium deposit is in the supraspinatus tendon or in the bursa. On one occasion the supraspinatus region was explored for the deposit, and the tendon of that muscle was found to be extensively impregnated with calcium granules.

As to treatment, the calcium deposit disappears completely in almost every case provided the joint is rested continuously and completely for a period of about 6 weeks. Splinting and moderate abduction are probably best because a considerable degree of periarticular fibrosis is left after the calcium disappears, and the restoration of movement, which may be very slow, is more readily accomplished from the abducted position. If one can be certain that the deposit is in the bursa, aspiration and irrigation through two large-bore needles, or incision and evacuation of the calcium, may hasten relief. Roentgenologists contend that roentgen therapy brings improvement, and even cure. One may be hesitant to recommend this form of treatment, however, when rest alone will bring improvement. In some acute cases, chemotherapy would appear to be indicated. KENNETH E. SHERMAN, M.D.

Giant Cell Tumors of the Bone (Tumores de celulas gigantes de los huesos). FRITZ SCHAJOWICZ and SILVANO MONDOLFO. *Rev. ortop. traumat.*, B. Air., 1951, 21: 3.

This rather complete and well illustrated article is based on an exhaustive study of 79 cases of giant cell tumors. These are summarized under the various forms of therapeutic management which include curettement, resection, radiotherapy, and amputation. The typical location is in the epiphysis of the long bones, most frequently in the lower extremity. This does not exclude, however, other positions of the body. The vascularity of the tumor is abundant and recent hemorrhage is common. In 57 of the authors' patients, 4 had sarcomatous changes, believed to have been brought about by excessive dosages of radiotherapy. The many varieties of giant cell tumors—myxomatous, telangiectatic, fibrotic, chondromatous, and xanthomatous—are listed. In the differential diagnosis, monostatic fibrosa, generalized osteitis fibrosa, myeloma, osteogenic osteolytic sarcoma, and Paget's disease are considered.

The many nuclear bodies in the cell are shown to be formed and grown in size by repeated divisions of the nuclei themselves. The cytoplasm is not involved. It is shown, moreover, that the so-called osteoclastic nature of the giant cell is uncharacteristic, and any term referring to this phase should be replaced by one more characteristically appropriate.

The author divides the giant cells into two forms, the simple and the malignant. It is believed that the latter is uncommon despite the fact that the simple giant cell may transform into a malignant form after roentgentherapy. Because the tumor recurs after bone-scraping or other therapeutic procedures does not necessarily make the tumor a malignant growth; giant cell tumors are aggressive and tend to recur.

Furthermore, it is believed that the nomenclature should be revised, since the myxomatous and telangiectatic forms of the tumor are considered as morphologic changes only and should not constitute a distinct class. The chondromatous form, on the other hand, may be what is termed a simple chondroblastoma. The other varieties are likewise differentiated and a more proper term is suggested. The need for such differentiation is apparent because the prognosis after therapy depends upon the type of tumor encountered.

Early radical treatment with total excision of the tumor gives the best results, when loss of function is not compromised. Amputation is limited to infected tumors in which sarcomatous changes have occurred, or in which the growth has reached a size which would make incision impossible. It is emphasized that amputation is not necessary in primary malignant giant cell tumors, because a favorable prognosis may be had with complete excision. Radiotherapy is indicated only when surgery is impractical.

STEPHEN A. ZIEMAN, M.D.

Primary Malignant Bone Tumors. A Report of 93 Cases Observed at Pondville Hospital, 1928–1949. GEORGE WHITE and MILTON ELKIN. *N. England J. M.*, 1951, 245: 351.

In instances of malignant bone tumors so situated that radical surgery of a curative nature can be carried out, the prognosis is better than it is generally thought to be. Of 18 such cases reported by the authors, in which there was no evidence of metastases, 7 patients were alive and free of the disease 5 years after the onset of symptoms. Ten of the patients had received primary treatment with substantial dosages of roentgen rays. One patient with Ewing's tumor was cured.

The various types of tumor considered by these authors consist of Ewing's tumor, osteogenic sarcoma, osteogenic sarcoma arising from Paget's disease, chondrosarcoma, and periosteal fibrosarcoma. Bone tumors usually manifest themselves early, by pain and swelling. Methods for definitive diagnosis are usually available, and the tumor site is usually accessible for radical therapy. In each of five groups of tumors studied, the incidence in males was found to be approximately twice that in females.

Primary malignancy of bone may occur at any age. In the present series, the youngest patient was 5 years old and the oldest patient was a 76 year old woman with osteogenic sarcoma. Ewing's tumor did not occur in any patient over the age of 30 years. Osteogenic sarcoma arising from Paget's disease occurs in the older age group; the youngest patient was 43.

In the 93 cases observed there were 97 primary sites (3 patients had multiple primary sites, about one-half of these being in bones of the extremities). The single bone most involved was the femur, usually at the distal portion. Sixty-four patients could recall no injury to the part, but 24 patients gave a history of injury to the region of the primary site at varying intervals of time before the onset of symptoms. Almost all of these injuries were of a minor nature, such as bruises from falls and those sustained in the performance of athletic activities; the evidence for trauma as a pathogenic factor does not seem to be convincing in this series.

In the histories of 48 cases, it was possible to determine roughly the time interval between the onset of symptoms and the occurrence of metastases as demonstrated in chest or bone films. Of the 48 cases, 14 showed metastases within 3 months of the onset of symptoms, although there is an inevitable time lapse before such a tumor can be shown in the roentgenogram. Within 9 months metastases were demonstrable in half of the 48 cases. This evidence of great rapidity of spread makes early diagnosis imperative.

In more than one-third of the cases, symptoms had been present for more than 3 months before a physician was consulted; however, in most cases there was a similar delay after the patient was under medical care. Treatment frequently was instituted for alleged "arthritis," "rheumatism," or "sprain." It becomes apparent that in any patient with persistent bone, joint, or muscle pain (in the absence of significant immediate trauma which would explain the pain) a primary bone neoplasm should be suspected. Pain and swelling are the chief symptoms and limitation of motion and crippling pain on weight-bearing are later manifestations.

Because 30 of the 93 patients had received treatment elsewhere, only 63 patients were admitted for primary therapy. In 10 of these, however, the lesion had already progressed too far to warrant any treatment. None of these 10 patients lived for 5 years. In another group of 18 patients, only palliative therapy could be offered. Again, at 5 years, none was alive and free of disease. The brighter side of the picture is that: of 24 patients treated surgically, 9 were alive at 5 years after the onset of symptoms; 2 of these had evidence of disease, the other 7 were free of their tumors.

Only 10 patients received primary treatment with substantial doses of roentgen rays. One patient (with a Ewing tumor) was cured, and is still alive 6¾ years after the onset of symptoms. Another patient (with a chondrosarcoma) is still alive 13½ years after onset of symptoms, though with evidence of disease.

Any avoidable delay between the onset of symptoms and the establishment of the correct diagnosis and treatment must not be tolerated.

KENNETH E. SHERMAN, M.D.

The Diagnosis, Differential Diagnosis, and Treatment of Periarthritis Humeroscapularis (Zur Diagnose, Differentialdiagnose und Therapie der Periarthritis Humeroscapularis). W. H. FAËHNDRICH. *Med. Welt.*, 1951, 20: 1305.

In the treatment of this condition the chief method of treatment employed is physical therapy and therapeutic gymnastics. The treatment session is started with local heat (hot air) to "loosen" the spasmodically contracted muscles, then trained personnel start the patient off with passive movements, going over finally into active movements. In addition, between sessions, the patient is taught to lie quietly with the arm in the position of greatest possible abduction.

Other forms of self-exercise are the grasping firmly of a bedpost and turning the body about the hand in such manner as to rotate the upper arm about its own axis; the grasping of a rod with both hands and raising it as high as possible in a horizontal position, alternately in front of, and then behind, the body; Indian-club exercises; and work with the medicine ball, the attempt being made to roll the ball all the way around the body at the waist line.

In those patients having clinical or roentgenological evidence of posterior root involvement, there is also administered stretching of the trunk, the head being suspended by means of the Glisson sling. After every suspension-exercise the gymnast attempts to loosen the muscles of the neck and back by massage and vibration.

Treatment with baths (balneotherapy) is included in the agenda, especially in the posterior root cases, but roentgen therapy is not available at the author's institution and he professes no experience therewith.

Of the 123 instances of periarthritis humeroscapularis here reported, 5 are excluded from the results because of roentgenological evidence of arthritis deformans. There were 70 instances of cure (57 per cent) with the described method of treatment, 44 (36%) of the patients were essentially improved, and 9 (7%) were without demonstrable improvement.

In this material there were 78 instances of a stiffened shoulder as a result of disuse (Ruhesteife of Payr) and 45 instances of clinical or roentgenological evidence of posterior root involvement. In the former group the results were rather better than in the latter. This is understandable, since in the posterior root involvements the osteochondrotic or spondylotic changes involving the sensory roots at or about the point of their passing through the intervertebral foramina would always form a nidus of irritation which would favor recurrence, while in the simple stiff shoulder of disuse the correction of the functional basis for the condition would be definitive.

Forty-four of the patients answered questionnaires sent to them from 6 months to 3 years later. Of these, 30 (68%) reported a complete cure, 12 (27%) reported improvement of their condition, and only 2 (5%) admitted no improvement. Thus, the questionnaire reports are even more favorable than the results recorded at the end of the course of treatment and, in the author's opinion, form a justification for the treatment-method of appropriate gymnastic therapy, since these patients were always strongly counseled to continue the exercises at home.

All in all, the author believes that the condition, when treated early and adequately, is susceptible of complete or (at least) far-reaching re-establishment of the functional capacity of the shoulder, although in those instances with an osteochondrotic or spondylotic involvement of the posterior roots in the neck, the chance of recurrence will always be present.

JOHN W. BRENNAN, M.D.

Tuberculosis of the Subdeltoid Bursa. ABEL KENIN. *Bull. Hosp. Joint Dis.*, N. Y., 1951, 11: 128.

Although rare, tuberculosis of the subdeltoid bursa without evidence of adjacent bony involvement is a clinicopathological entity. The diagnosis is made on the basis of a careful history and physical examination, and can be confirmed before operation by laboratory methods. Excision of the infected bursa is the treatment of choice. When the patient's general condition is poor, repeated aspiration with rest in a shoulder spica is the treatment of choice.

DANIEL H. LEVINTHAL, M.D.

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC.

Osteoarthritis of the Pisiform-Triquetral Joint. S. AUBREY JENKINS. *J. Bone Surg.*, 1951, 33-B: 532.

Localized monarticular arthritis of the pisiform-triquetral joint is an unusual condition and a study of the literature has failed to reveal any record of this condition.

The author outlined 3 case reports, 2 of which were borrowed from other workers. In the first case the arthritis appears to have developed after a fall on the wrist which injured the pisiform bone and the underlying joint. The pathologic changes were like those of osteoarthritis in other joints—destruction of articular cartilage, eburnation of the underlying bone, and osteophyte formation at the articular margins.

In all 3 patients, pain was the outstanding symptom. It was aggravated by contraction of the flexor carpi ulnaris, especially with the wrist in ulnar deviation, and a painful crepitus was easily demonstrated by grasping the pisiform bone between the finger and thumb and moving it from side to side. To confirm the diagnosis, a special roentgenographic projection is advisable. The wrist is slightly abducted and the forearm rests on its ulnar side with the dorsal surface at an angle of 60 degrees to the plane of the film. The position is improved by dorsiflexion of the wrist.

Removal of the pisiform bone does not seem to interfere with the normal function of the hand. Therefore, if conservative treatment of the painful joint is unsuccessful it is reasonable to remove the pisiform bone rather than to attempt arthroplasty or arthrodesis of such a small and unimportant joint.

Within a few weeks of the operation the symptoms were completely relieved and there was a full range of painless movement in the wrist in 2 of the cases.

In the third case there was still slight wasting of the hypothenar and interosseous muscles, but the patient regarded the cure as complete about 8 months after surgery. C. FRED GOERINGER, M.D.

Osteoarthritis of the Hip; Its Surgical Treatment. WALTER MERCER. *Edinburgh M. J.*, 1951, 58: 521.

The author considers in detail the surgical treatment of osteoarthritis of the hip, and reviews some of the clinical features as well as the pathological changes that are seen in it. He believes that it is a disease of modern civilization, one that may well be due to the fact that most of our weight-bearing life is spent now on hard surface material as contrasted to the soft ground on which our ancestors walked. Another factor, undoubtedly, is our increased life expectancy.

The most prominent pathological features are disintegration of the cartilage, later the disintegration of bone, including marginal spurs or osteophytes. Pain is believed to be due to stretching of the capsular structures, although the author admits that pain on weight-bearing may be due to the contact of exposed articulating bone ends.

In treatment, the importance of evaluating the patient as a whole is emphasized and various conservative measures are listed. The list does not include the use of any of the more recent endocrine preparations. Under surgery, the author considers neurectomy, osteotomy, capsulectomy, arthrodesis, arthroplasty, and replacement of the head of the femur with an acrylic head.

Of 88 patients treated with one or more of the procedures, 48 in a later follow-up showed no pain and 27 had only slight pain. The operative procedure to be followed should be carefully selected to suit the individual patient, and no one type of operation should be followed to the exclusion of all of the others. The author has been favorably impressed with the recent cases in which replacement of the head of the femur was carried out and he believes that this operation has much to commend itself.

EDGAR L. RALSTON, M.D.

FRACTURES AND DISLOCATIONS

Experimental Study of the Effect of Hyaluronidase on the Healing of Fractures. GUSTAV-ADOLF LANDOFF. *Acta orthop. scand.*, 1951, 21: 5.

Hyaluronidase is capable of increasing the permeability of the tissue by an enzymatic effect on the hyaluronic acid contained in the intercellular substances of the connective tissue. This study was based on the supposition that the resorption of the necrotic debris accumulated around a fresh fracture might be accelerated by increasing the local permeability with hyaluronidase and in this manner induce callus formation. However, another consideration was the possibility that hyaluronidase might impede the accumulation of an adequate concentration of bone salts necessary for calcification and also affect the intercellular substance and the maturation of the collagen.

A small piece of the fibula was resected from both legs of a series of rabbits. The site of resection on one side was then treated locally every third day with an injection of 2 I. U. of hyaluronidase. The leg of the other side was used as a control. The leg treated with the hyaluronidase was found to heal more slowly than the other leg. Chemical analysis revealed a lower concentration of bone salts in the callus tissue treated with hyaluronidase. Histological examination of the soft tissue callus presented a normal picture.

Levander and Urist found that the development and differentiation of connective-tissue callus do not require the presence of bone salts. Whether the lack of calcium and phosphorus observed in the present investigation is due to direct prevention of a local accumulation of salts by removal or diffusion of the salts, because of the increased permeability of the tissue due to the hyaluronidase, and whether hyaluronidase directly inhibits the fixation of bone salts by the cells or changes the optimal conditions for precipitation and phosphatase activity are questions that require further study.

The examination showed that local injections of hyaluronidase into operatively-produced defects of the fibula in rabbits retard bone repair and that this retardation is probably due to the enzyme that decreases the accumulation of bone salts in the callus tissue.

The assumption that the hyaluronidase injections caused changes in the intercellular substance could not be confirmed by the experiments with the means available to the author at the time of the investigation. C. FRED GOERINGER, M.D.

The Efficiency of Various Methods of Osteosynthesis for Recent (Noncompound) Fractures (Die Leistungsfaehigkeit der verschiedenen Osteosynthese-Methoden bei frischen geschlossenen Bruechen). C. HAEBLER. *Chirurg*, 1951, 22: 433.

The therapy of fractures is a mechanical as well as a biological problem. If only one of these problems is solved failure may result. Every fracture causes degenerative and transformative activities with absorption of the necrotic tissue in the fracture area, extending up to 2 cm. The necrosis involves mainly the bone denuded from the periosteum, and the thicker the bone the more extensive is the zone of degeneration. The latter serves as a callus-forming stimulus. The larger the fracture gap the more regenerative power is required. Absolute fixation may be harmful by obviating the mobilization of callus material. While pressure forces are favorable, shearing forces are harmful.

The 4 basic laws in fracture treatment are:

1. Exact reposition
2. Continuous fixation until bony union occurs.
3. Movement of the adjacent joints.

4. Avoidance of unphysiological stimuli (massage, motion, foreign bodies).

Although the V2A steel is almost inert, it still can break down or prevent the formation of callus if there is no absolute fixation. In recent fractures the use of bone grafts is not advisable because the grafts start to undergo absorption when the breaking-down phase at the fracture site is at its height. However, in cases of pseudarthroses the transplanted bone serves as a physiological stimulus for regenerative powers.

The author is a fervent opponent of open medullary nailing and prefers the closed procedure with 8 days of preliminary traction for femoral fractures. Even when the nail becomes loose, pressure on weight-bearing helps further impaction between the fracture zones and no shearing force is present. In fractures of the upper extremity distracting forces are in existence unless special precautions are taken (abduction-position, medullary nail spring). Gentle manipulation and careful impaction has to be emphasized. For the oblique fractures of the lower leg the old method of wire encircling is still considered the most physiological because the slings become tighter when the conic fragments slide toward each other. The distracting force of the fibula has to be eliminated by osteotomy or resection.

The Lane plate with screw fixation is considered as antiquated except in supracondylar fractures in which no intramedullary nailing can be done; a cast is necessary. The use of screws is advocated mainly for joints near spongiosa fractures (condyles). For fractures of the humeral condyle the spongiosa spring by Maatz is recommended. The wiring is reserved for fractures of the kneecap and of the olecranon; in the latter, plaster immobilization is also necessary to prevent distraction of the fracture gap.

E. H. BETTMANN, M.D.

Fracture of the Capitate Bone—Report of 2 Cases. RICHARD L. FENTON and HOWARD ROSEN. *Bull. Hosp. Joint Dis.*, N. Y., 1951, 11: 134.

Most carpal fractures are caused by a fall on the outstretched hand with the wrist in varying degrees of dorsiflexion and ulnar or radial deviation. More rarely, they are caused by direct violence. The large capitate bone occupies the keystone position in the carpus, dominating the distal row of bones. In a fall on the open palm with the wrist forced into dorsiflexion and radial deviation, the navicular bone is caught between the pointed radial styloid and the posterior margin of the radial articular surface and the capitate. This usually results in fracture of the navicular through its waist. Rarely, the capitate may fracture and, less frequently, both the navicular and the capitate, as in one of the authors' cases. In both of the cases presented, excision of the fragments was necessary because there were persistent symptoms and because there was no apparent blood supply to the proximal fragment.

DANIEL H. LEVINTHAL, M.D.

Fractures of the Upper Thoracic and Cervical Vertebral Bodies. OLOF OLSSON. *Acta chir. scand.*, 1951, 102: 87.

The author reported 31 fractures of the thoracic vertebrae, from the first to the eighth inclusive. Treatment of these vertebral body fractures was essentially the same in all cases, namely, 4 weeks of rest in bed followed by physical exercise. There were 24 patients, of which 20 were re-examined at least 1 year after the accident. All were able to return to their usual work. Three had fairly moderate persistent pain. In these 3 cases there was disc injury and healing did not occur with anterior fusion. The evidence did not prove that severe compression caused more persistent severe pain than slight compression.

Sixteen cervical fractures in 15 patients were reported. Ten patients were treated with bed rest only and 3 with Glisson's sling; 1 patient was treated with Glisson's sling and afterward with a plaster collar, and another was treated with a plaster collar. One of the patients died of his injuries, 1 had persistent pain and slight limitation of movement but without interference with his capacity for work, and 1 patient had mild persistent symptoms in the form of backache after heavy work.

DANIEL H. LEVINTHAL, M.D.

Lumbar Rib and Fractured Transverse Process; Their Significance as a Center of Irritation (Lendenrippe, Querfortsatzbruch und ihre Bedeutung als Irritationszentrum). D. GROSS. *Deut. med. Wschr.*, 1951, 76: 1389.

Lumbar ribs are due to nonunion of a rudimentary rib with the transverse process. Fracture of the transverse process is usually caused by severe pull of the quadratus lumborum or longissimus muscle with 2 to 3 months of disability.

The author describes the history of 7 patients with either fractured transverse processes or lumbar ribs in whom the local administration of novocain or injections of impletol resulted in dramatic and mostly persistent relief.

The pathology is explained on the basis of a possible distortion of the lumbocostal articulation, which as a center of irritation causes (in the light of "relationpathology") a sensitization of a postgangliar axon reflex leading to a change of the vascular bed (vasoconstriction). These functional changes lead to a pain complex which can be blocked by localized anesthesia with evident cure. An extensive bibliography is added to this challenging and timely concept.

E. H. BETTMANN, M.D.

Complications of Intramedullary Fixation of Fractures of the Femur. WALTER G. STUCK and MILTON S. THOMPSON. *Arch. Surg.*, 1951, 63: 675.

The authors discuss the complications which occurred during the treatment of 70 fractures of the shaft of the femur with intramedullary fixation.

The complications (from errors in the selection of patients and their treatment) were as follows:

1. Telescoping of the fragments of comminuted fractures. The selection of fractures with larger fragments and stabilization of the fragments with wire loops will prevent this.
2. Instability of the fixation. The use of casts and braces to prevent angulation is necessary.
3. Failure of the formation of callus. This occurs mainly when bed rest is required because of other fractures. Systematic exercises aid in its prevention.
4. Shock.
5. Infection. It is important not to select patients with bed sores, poor skin, and remote infections. Compound fractures should be nailed a month after primary healing of the original wound.
6. Metastasis due to the nailing. This is an unusual happening; an interesting instance is reported.

Certain complications result from inadequate equipment, poor selection of the nail, and improper technique. Splitting of the cortex, impaction of the nail, separation of the fragments, and motion at the fracture site occur from poor selection of the nail and its insertion. Pain in the knee, pain in the hip region, and misdirection of the nail occur. Bony caps may form and callus formation is delayed if the time interval between the injury and the nailing is too great. Fat embolism is feared but did not occur in the authors' experience. One death occurred from a lower nephron nephritis in a patient who had had both femurs nailed at one operation.

A third group of complications occurred during the healing period; these may be avoided by adequate after-care. They were as follows:

1. Wound infection. Immobilization, drainage, and adequate antibiotic therapy are important in preventing this. The nail need not be removed.
2. Delayed healing and nonunion. Early partial weight-bearing promotes healing, but too much or too early weight-bearing may be harmful.
3. Complications in remote organs. None occurred in this series of cases.
4. Failure to remove nail. The authors remove the nail after a year, but they have no proof that it is detrimental to allow it to remain in place.

DONALD C. GEIST, M.D.

Necrosis of the Head of the Femur Following Fracture of the Femoral Neck; Its Origin and Treatment (Die Hueftkopfnekrose nach Schenkelhalsfraktur; ihre Entstehung und Behandlung). M. LANGE. *Muench. med. Wschr.*, 1951, 93: 1925.

The author does not believe that the development of necrosis of the head of the femur is the result, exclusively, of faulty technique in the present-day nailing procedures, since he and other of the older men have been accustomed to encountering such necrosis, even with the old conservative methods of treatment of fracture of the neck of the femur. Neither does he think that the technique of nailing is always blameless with reference to the development of such a contingency. It is easy to conceive how healing of the fragment comprising the head of the bone could be prevented, by being fastened (by means of the nailing) at an angle, in a canted position, or with the leaving of a cleft between the two fragments. It is also probable that the nail could be driven to so near the cartilaginous calotte as to affect its trophic processes. One can hardly be indifferent to the leaving of the huge metal nail penetrating the neck and head of the hip bone. Certainly, as soon as a reasonable amount of bony healing of the fracture has developed, and surely with the first evidence of healing disturbance in the joint, the nail should be removed.

However, even before the first appearance of articular disturbance, prophylactic treatment of necrosis of the femoral head should be instituted. The treatment actually begins as a precise setting of the break and the nailing should be carried out *lege artis*, with utmost care, avoiding all semblance of violent manipulation. The patient should be gotten out of bed early but should not bear the body weight on the leg before bony union is complete. The patient may begin to walk after 2 weeks, but only with the ambulatory apparatus (wagon), or with the aid of crutches. Comparative roentgenologic examinations, as well as physical examination of the functional capacities of the hip joint, should be carried out every 3 months.

When the condition becomes advanced, operation is imperative. Arthrodesis and arthroplasty, the two operations of choice, do not compete here; each has its own indications. Arthrodesis—and this may seem strange—is regarded as more appropriate for the young individual. This results partly from the fact that the older patient with necrosis of the head of the femur may not have the new bone-forming capacities for the production of a solid arthrodesis. The choice also results partly from the fact that the young individual must be prepared for a life of hard toil.

Even in these young individuals, however, the author finds that ordinary nailing for the operation of arthrodesis is insufficient; even the double nailing technique is not absolutely reliable. The technique used by the author consists in the exposure of the joint by lateral and anterior incision of the joint capsule. The head is not luxated. The articular cartilage is removed. A nail is then driven from the lateral surface of the femur into the heavy upper margin of acetabulum. A broad groove is then chiseled between the head of the femur and the roof of the acetabulum. Porous bone chips from the greater trochanter are inserted between the acetabulum and the freshened surface of the femoral caput. A strip of bone, also taken from the trochanter major, is fitted into the groove described. Immobilization in plaster is effected for 4 to 6 weeks, then in a smaller plaster cast for 3 weeks longer. If, later, an adduction contracture develops, it is corrected by subtrochanteric osteotomy.

Arthroplasty is preferable for the older patient. In these cases of necrosis of the head, conditions are favorable for this operation. Where the acetabulum is intact, the chief concern will be the conservation of the muscular power and its proper after treatment. The work of Judet and others in this field offers encouragement. JOHN W. BRENNAN, M.D.

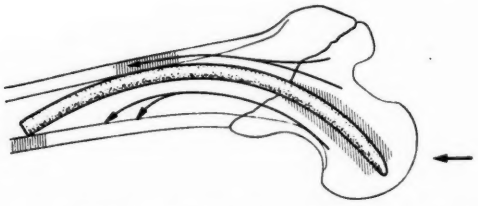


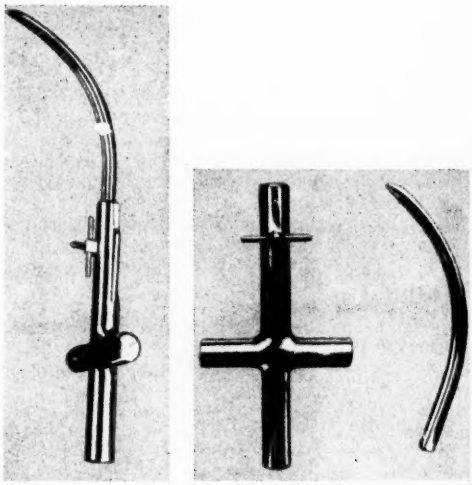
Fig. 1 (Meins). The three anchorage joints of the nail in the medullary cavity.

Nailing of Pertrochanteric Fractures by Round Nail (Pertrochantere Frakturen und Rundnagelung). GUIDO MEINS. *Chirurg.*, 1951, 22: 443.

The average time for conservative hospital treatment with traction is about 15 weeks, with complications of joint stiffness, neck deformities, and 23.5 per cent mortality (hypostatic pneumonia, 13; circulatory failure, 8; embolism, 2; apoplexy, 1). Sixteen patients were treated with a round nail most successfully according to the method developed by Lezius (*J. Internat. Coll. Surg.*, 1950, 13: 569). The procedure is as follows:

Reduction under spinal anesthesia and x-ray control. The round nail with a curve of 125 degrees of from 15 to 17 cm. in length and 10 mm. in diameter is driven in from an 8 to 10 cm. long incision over the medial aspect of the femur between the adductor and vastus medialis group. For proper positioning a wire mesh (Jeschke) and a caliper are used. The drilled hole has to be large enough to avoid splintering and the measurements have to be very exact to prevent penetration through the corticalis into the soft tissue. X-ray control ensures solid anchorage of the nail in the medulla.

Fig. 3 (Meins). Pertrochanteric fracture 16 weeks after nailing.



2a 3b

Fig. 2 (Meins). a, The round nail in the guide instrument. b, The round nail before being fitted into the guide.

Most of the patients were between the ages of 60 and 80 years. They became ambulatory from 10 to 14 days after the operation and left the hospital after 3 or 4 weeks. E. H. BETTMANN, M.D.

Simplified Technique of Femoral Neck Pinning (Vereinfachte Technik der Schenkelhalsnagelung). FRITZ REHBEIN and HEINZ GELBKE. *Chirurg*, 1951, 22: 439.

The problem of nailing of the femoral neck is still complicated by pseudarthrosis, necrosis, and reluxation. The following requirements should be maintained:

1. Stable osteosynthesis
2. Simple technique
3. Minor surgery
4. Inexpensive instrumentarium

1. A nail following the spongious neck axis is not osteostabile because of distracting tensions in the cranial portion. Therefore, a more steep and dorsal position of the nail end in the cortical region and tangential anchorage in the lower neck region, the so-called Adam's arc, are required; this makes cutting-through or lowering of the nail tip impossible. The best position of the nail is steep, caudal, and dorsal.

2. The technique should be "automatic"; guide wires are not recommended because of the lack of

manual feeling. The number of guide instruments indicates their inadequacy.

3. Percutaneous nailing (under x-ray control) with a buttonhole incision is preferred as it requires minimal time and little assistance.

4. The universally employed Smith-Petersen nail has been discarded by the author in favor of the cheaper V-shaped Becker nail, from 12 to 15 cm. in length and 12 mm. in width. The presence of saw-like indentations at the distal end prevents retrograde loosening of the nail.

The other instruments required are several marking nails (17 cm. long) which fit into the hub of a hand drill with a curved handle, an impactor, hammer, small retractor, metal ruler, and the Kuentscher remover.

The horizontal positioning of the femoral neck is of great importance. After disinfection, one marking nail is driven into the dorsolateral aspect of the femoral cortex from 3 to 4 fingerbreadths below the greater trochanter while the nail feels its way within the femur's width. After x-ray control a second nail pointing dorsally is driven in. After removal of the first nail an incision 2 cm. long is made down to the bone and the drill is connected with the nail to a unit. After a cortical window is drilled the guide arrow is pushed into the head fragment and the nail is driven home over it. Two roentgenograms (plane) determine the proper position. Only 2 skin sutures are required. E. H. BETTMANN, M.D.

ORTHOPEDICS IN GENERAL

The Influence of Pressure and Tension on Growing Bone in Experiments with Animals. HEINZ GELBKE. *J. Bone Surg.*, 1951, 33-A: 947.

The author reports a series of experiments on the effect of pressure on bone growths. The experiments were arranged in such a way that tension and gliding were eliminated and only one direction of mechanical force, or pressure, could affect the bone.

The author concludes from his experiments that only extremely high pressure can result in the limitation of growth at the epiphysial plate. The inhibition of growth due to pressure is due to the prevention of proliferation in the growth cartilage which narrows and becomes irregular in its arrangement.

Strong and permanent tension does not increase intercondylar bone growth. On the contrary, it has nearly the same effect as compression when it is applied directly to the bone.

The author also noted that these changes caused by mechanical force appeared to be reversible to a certain extent if the forces were removed before skeletal maturation. EDGAR L. RALSTON, M.D.

Preventive and Conservative Treatment of Osteochondrosis Dissecans. HANS NOVOTNY. *Acta orthop. scand.*, 1951, 21: 40.

Three cases of ossification disturbances in children aged 6 to 11 years were reported, 2 of them with symptoms resembling osteochondrosis dissecans, in whom the roentgenological examination showed accessory osseous nuclei at the distal femoral epiphyses, and 3 with typical osteochondrosis dissecans, from 12 to 21 years of age. All of the patients were treated by immobilization in plaster of paris. In all but one, fusion occurred in the course of about 3 months. In the first group of patients it was suggested that an early stage of osteochondrosis dissecans had existed, which was characterized by clinical symptoms and the presence of osseous nuclei in the roentgenograms. These cases seemed to support Ribbing's theory of the connection between the nuclei in the epiphyses and the development of osteochondrosis dissecans; therefore, preventive treatment of osteochondrosis dissecans seemed possible. In the second group of cases, conservative treatment of early osteochondrosis dissecans appeared to give good results.

The author observed from a study of the literature that single or multiple recurrences of loose bodies after operation are no rarity. Arthrosis may develop or increase after operation. Practically all of the cases in which the more or less loose bodies were removed and the focus (bed) from which the body had separated was chiseled off, presented poor final results. If the loose body only was removed, arthrosis developed to a lesser degree.

If a loose body has been removed by operation, the danger of recurrence may be decreased by partial immobilization of the joint for 4 to 6 weeks. The encroachment itself may have a mobilizing effect on hidden multiple foci; this must be overcome by immobilization.

The various theories about the cause of osteochondrosis dissecans were discussed. Ribbing's theory, which reports the presence of an anatomical substratum connected with osteochondrosis dissecans in the accessory ossification centers (ossicula, osseous nuclei) of the epiphysis, supports constitutional, but does not exclude traumatic, factors for the explanation of its occurrence.

In 1937 Ribbing obtained roentgenological pictures very much resembling those of osteochondrosis dissecans from several members of a family with hereditary disturbances of epiphysial growth. Having had the opportunity of following the development of a condition similar to osteochondrosis dissecans from the ossicula of the femur-epiphysis in one of the family, this worker later examined the epiphyses of normal children of different ages while searching for the appearance of ossicula. He examined about 200 boys of different ages and about just as many girls and found that, taking both groups as a whole (ages 1 to 10 years), boys showed ossicula at the distal femoral epiphyses three to four times as often as girls. Ossicula were seen in 29 per cent of the boys. In girls they were observed only occasionally after the age of 4 years, while in boys they disappeared at the age of about 10. Of the 20 boys examined by the author at random for ossicula at the distal femoral epiphyses, 3 had especially large ossicula and 2 of these had a certain amount of pain.

Ossicula persisting after the age of 4 to 5 in girls and after 10 to 11 in boys should be looked upon as being not quite normal.

The author reasoned that it should be possible to observe symptoms at an earlier age than about 15 if the epiphysial ossicula are the basis for the development of osteochondritis dissecans. Case histories were presented in which locking symptoms in the knee joint occurred at early ages. Of 6 case histories presented, 3 show that there is probably an early stage of osteochondrosis dissecans which gives rise to the same symptoms as the mature condition. The pathological substrate of this early stage probably consists of osseous nuclei in the epiphysis with decreased vitality. The condition can be clinically observed, and treated successfully by immobilization in plaster of paris. Therefore, osteochondrosis dissecans can probably be prevented if its early stage is discovered in time.

C. Fred Goeringer, M.D.

Prolonged Traumatic Arterial Spasm after Supracondylar Fracture of the Humerus; Report of a Case. J. C. F. Cregan. *J. Bone Surg.*, 1951, 33-B: 363.

This is a report of a 7-year-old girl who was admitted to the hospital after sustaining a supracondylar fracture of the left humerus. Two unsuccessful attempts at closed reduction had been made. After the first attempted reduction, it was observed that the radial pulse was absent.

On admission to the hospital, her left elbow and forearm were tensely swollen and her hand was cold and pale. Neither the radial nor ulnar pulse could be felt. Because there was no improvement, the brachial artery was explored 3 hours after admission. No localized arterial injury was found. The brachial plexus was infiltrated with 1 per cent solution of procaine and the fracture was reduced. The hand then gradually became pink and warm, and, after 12 hours, the radial pulse returned. Six months later there was full range of action and there was no evidence of ischemic muscle contracture or of nerve lesions.

The case merits report because the persistence of severe ischemia and complete arterial arrest for more than 9 hours after the original injury did not lead to ischemic contracture. Open operation disclosed that there was no anatomical obstruction to the circulation.

Kenneth E. Sherman, M.D.

Experimental Tuberculosis of the Knee Articulation in Rabbits With and Without Treatment with Peteosthor (Ueber die experimentelle Kniegelenktuberkulose des Kaninchens mit und ohne Peteosthorbehandlung). J. Buergers, H. Schoen, and H. Spiess. *Langenbecks Arch. Deut. Zschr. Chir.*, 1951, 269: 137.

Articular tuberculosis was produced in rabbits by means of intra-articular injections of a suspension of virulent tubercle bacilli. The lesions resembled closely those of tuberculous arthritis in man. Serous or serofibrinous hydrops or fungoid types of tuberculosis were found in the rabbits.

Peteosthor is a preparation containing thorium X, eosin, and platinum. After the intravenous administration of this drug over a period of 17 weeks no effect on the tuberculous lesions could be detected by clinical and roentgenographic examinations. There were no signs of regression, encapsulation, or cicatrization.

Joseph K. Narat, M.D.

SURGERY OF THE BLOOD AND LYMPH SYSTEMS

BLOOD VESSELS

Disturbances of the Peripheral Circulation and Their Treatment with Padutin (Ueber periphere Durchblutungsstoerungen und ihre Behandlung mit Padutin). FRANZ SCHEDEL and FRANZ EISENREICH. *Langenbecks Arch. Deut. Zschr. Chir.*, 1951, 269: 168.

A study of patients with circulatory disturbances should include the examination and treatment of the teeth because elimination of dental granulomas not infrequently greatly increases the response to sympathetic block or the administration of drugs such as priscol or padutin. Ergometric recordings, roentgenograms, and arteriograms are made routinely.

The term "Raynaud's disease" is applied to circulatory disturbances with negative arteriographic findings, and the term "endangiitis obliterans" to vascular occlusion or changes in blood vessel walls without demonstrable calcification.

Endangiitis obliterans usually shows progressive tendencies. Its etiology remains obscure, although predisposition, abuse of tobacco, thermal and chemical factors, focal infection, and mental conditions appear to exert an influence upon its genesis and course.

In 26 of 100 cases of endangiitis obliterans, amputation was performed, while in the remainder treatment with padutin was successful. From 40 to 160 units of the product in 1 liter of physiologic saline solution were administered intravenously. Chills were frequently observed. Repeated infusions were required to prevent a relapse. So-called depot-padutin overcomes such drawbacks. Forty units in 2 c.c. of the solvent are administered intramuscularly every day and later on at greater intervals. Unfortunately, permanent results cannot be obtained, but long-lasting results after surgical procedures are also relatively rare.

JOSEPH K. NARAT, M.D.

Postphlebitic and Varicose Venous Stasis. W. J. MERLE SCOTT. *J. Am. M. Ass.*, 1951, 147: 1195.

A disturbance in the return of venous blood and lymph from the subcutaneous region of the lower part of the legs is usually expressed in one of two ways, varicose veins or postphlebitic lymphedema. In cases of varicose veins the competence or gross incompetence of the perforators is of fundamental importance. If the perforators are competent, high saphenous ligation will overcome the venous stasis, but if they are incompetent, no permanent benefit is achieved by such ligation. In cases of severe postphlebitic lymphedema, it can be assumed that the perforators are grossly incompetent and that the orthostatic venous hypertension cannot be overcome by the pumping action of muscular contraction in the lower part of the leg. If the lymphedema continues, subcutaneous induration, pigmentation, and ulceration are likely to follow.

External compression by elastic stockings, adhesive tape strapping, Unna paste boots, sclerosing venous injections, and ligation of the incompetent perforators with high ligation of the saphenous trunk have been used to overcome venous stasis associated with incompetent perforators. All these methods have serious defects.

During the last 10 years, the author has treated more than 350 patients with venous and lymphatic stasis of the lower extremities at the University of Rochester School of Medicine and Dentistry, Rochester, New York, by the application of a regulated pulsatile air-pressure legging. This legging is constructed of an inelastic material containing an inflatable rubber bladder, which is pumped up after the legging is put on the leg. A controlled and uniform pressure throughout the extent of the leg is applied and as the patient walks, there is a rhythmical rise in the pressure with each contraction of the muscles. Swelling due to postphlebitic lymphedema or to varicose venous stasis is adequately controlled by this method. It is of no value in the control of inflammatory swelling. Of 105 stasis ulcers in the lower part of the leg, 89 have been completely healed by treatment with the pulsatile air-pressure legging. Many of these ulcers had failed to heal after treatment by standard methods for 3 years.

The patient remains ambulatory throughout treatment. Once the legging has been properly fitted, the patient can apply it and inflate the bag with little difficulty. The optimal amount of pressure is approximately 35 mm. of mercury. After the ulcer heals, the induration recedes and the nutrition of the skin improves; usually the patient can be allowed to go without the legging from 10 to 25 per cent of the time that he is up and about.

Case histories of 7 typical patients are recorded. It is pointed out that the application of the pulsatile air-pressure principle in the treatment of postphlebitic and varicose venous stasis was successful in severe cases when all previous standard methods had failed.

CURTIS ARTZ, M.D.

Aneurysms of the Brachiocephalic Circulatory Region and Further Experiences with Sternoclavicular Mediastinotomy (Aneurysmen des brachiocephalen Stromgebietes und weitere Erfahrungen mit der Mediastinotomia sterno-clavicularis). HANS KILLIAN. *Langenbecks Arch. Deut. Zschr. Chir.*, 1951, 269: 200.

Of 3,407 aneurysms collected from the literature, 1,136 affected the cerebral arteries and 924 the extradural portion of the internal carotid artery within the skull. Of 787 aneurysms of the neck region, 305 affected the common carotid artery, 11

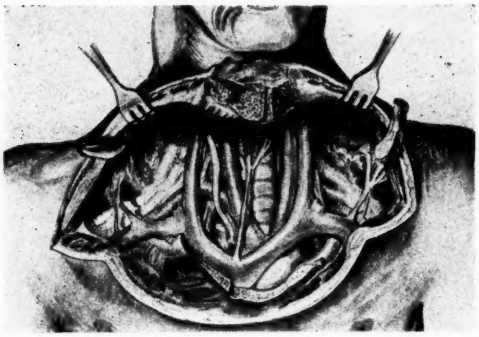


Fig. 1 (Killian). Topographic view after bilateral sternoclavicular mediastinotomy.

the carotid sinus, 173 the extracranial portion of the internal carotid artery, 176 the external carotid artery and its branches, 17 the thyroid arteries, and 126 the extracranial portion of the vertebral artery.

Aneurysms of the extracranial portion of the internal carotid artery, when located low, present no technical difficulties. If the lesion is located high, the access to it may require severing of the lower jaw. Retrotonsillar aneurysms may lead to fatal hemorrhages after perforation. Such lesions cannot be attacked directly but should be treated by gradual compression and final ligation of the internal or the common carotid artery below the aneurysm.

Ligation of the carotid artery in the neck is risky and should be substituted for, whenever possible, by lateral suturing of the blood vessel wall. Circular suture, also, is not difficult. Venous grafting is usually superfluous.

Exposure of an aneurysm of the cervical portion of the vertebral artery is difficult and may require resection of the anterior portions of the transverse processes of cervical vertebrae and exposure of the spinal canal.

Aneurysms of large vessels in the mediastinum can be diagnosed easily but the operation is risky. The customary methods of approach produce serious damage of the osseous structures, especially of the sternoclavicular articulation, and provide an unsatisfactory exposure. Pseudarthrosis of the clavicle, dislocation of the aforementioned articulation, or a loss of a portion of the manubrium sterni may result. Therefore, the author has developed the following method:

A curvilinear incision is carried from the sternocleidomastoid muscle of the normal side over the manubrium sterni and below the clavicle of the affected side to the infraclavicular fossa. A finger is placed underneath the manubrium and a hole is drilled through its center 5 cm. below its upper border. Two Gigli wires are so placed through this opening that a triangular part of the bone together with the sternoclavicular articulation can be removed. The insertion of the first rib is also severed without injury to the mediastinal pleura. After section of the clavicle and its separation from the pectoralis muscle, the sternocleidomastoid muscle pulls the entire osteoplastic structure upward. Either unilateral or bilateral exposure can thus be obtained. After the operation the osteoplastic flap is replaced and the triangular piece of bone is immobilized with wire sutures.

The author used this method successfully in 36 cases of aneurysm of the subclavian artery and 40 cases of mediastinal tumor.

JOSEPH K. NARAT, M.D.

The Preservation of Arterial Grafts. The Influence of Cold Temperature and Lack of Oxygen, and a Method for Rapid Determination of the Vitality of the Grafts (Ueber die Konservierung von Arterientransplantaten, den Einfluss von Kaelte und Sauerstoffmangel und eine Methode zur schnellen Feststellung ihrer Lebensfaehigkeit). KARL BAETZNER and GUENTER GRUPP. *Langenbecks Arch. Deut. Zschr. Chir.*, 1951, 269: 122.

Situations may arise which require grafts for bridging defects in the thoracic aorta. While segments of the femoral vein are suitable for covering defects in the peripheral arteries, they are too narrow for replacing resected segments of the aorta. Therefore, only aortic grafts from young victims of accidents come into consideration.

The authors preserved their specimens in homologous blood, homologous serum, so-called balanced salt solution, physiologic saline solution, Ringer's solution, and Tyrode solution.

The usefulness of preserved arterial grafts is usually tested in dogs, but several months are required for such experiments. Tissue cultures, likewise, require a long period of time. The authors developed a method which permits determination of the vitality of the graft on the day of the operation. The method is based on the reaction of the isolated arterial ring to thermal and chemical stimuli.

Rabbits were bled through an incision in the carotid artery without anesthesia to avoid the untoward effect of ether. Segments of the thoracic aorta, 1 cm. in length, were placed in test tubes containing one of the aforementioned media and were kept in a refrigerator. For testing, the rings were split and connected with a kymograph. Vital specimens regained their tonus under the influence of raised temperature and the addition of adrenalin.

Preserved blood, changed every 4 hours, proved to be the best medium because it contains oxygen carriers. Grafts preserved in formalin or alcohol, or those kept at the temperature of −70 degrees C., should not be employed. JOSEPH K. NARAT, M.D.

SURGICAL TECHNIQUE

OPERATIVE SURGERY AND TECHNIQUE; POSTOPERATIVE TREATMENT

The Transfer of Whole Thickness Pedicled Skin Grafts in the Lower Extremities (Injertos Pediculados Planos Cruzados en los Miembros Inferiores). ALBERTO ALBERTENGO. *Dia méd.*, B. Air., 1951, 23: 3463.

The skin flaps or pediculated grafts used by the author include all the subcutaneous tissues to the fascia itself. They, of course, include both vascular plexuses, the deep subcutaneous tissue, and the superficial subdermal tissue with their rich anastomoses. For this reason trimming of the flap, where it might be considered too thick, must be avoided whenever possible. The surface of the flap must also be made sufficiently extensive so that allowance can be made for shrinkage and the necessity for suturing under tension is eliminated. The author uses flat transplants (planos); tubular transplants are mentioned but do not seem to have been used. The usual transference has been from one lower extremity to the other (cruzados).

The flaps are cut so as not to include a major arterial branch; if such a branch should be included the powerful influx of arterial blood might not be carried off by the venous outlets, with resultant swelling and edema of the transplant. In carrying over the flap to the receptor extremity, while it is still attached by its pedicle to the donor extremity, as little of the bridging pedicle as possible is left exposed by its raw undersurface. This decrease of exposure of the pedicle is obtained by placing the donor extremity in as favorable a position as possible with reference to the receptor. In especially long exposed pedicles a special technique is illustrated, whereby the raw undersurface of the flap is covered by a free transplant, by the turned back skin border of the area to be grafted, or by both of these tissues.

The approximation of the two areas (donor and receptor) will require a great deal of thought and care. The position to be assumed will at times be of a character designated by the author as "acrobatic." For this reason the co-operation of the patient will be necessary, and therefore this method is not recommended for the very young, for the very old with their fragile blood vessels, and for the mentally irresponsible.

After the transplant has been sutured to the receptor area the operator waits (in accordance with the obvious progress of the new vascularization) 1 or 2 weeks. One of the chief considerations with reference to this period of waiting is the dimensions of the flap itself. If it is as long as it is wide it may be transplanted almost immediately, if it is one and one-half times as long as it is wide it will require the maximum of "delay" in transplanting. The author does not make the flaps more than one and one-half times as long as they are wide.

The time to cut the pedicle loose will depend, of course, upon many factors. Mention is made in this connection of the usual tests for independent viability of the transplant (compression and notching in of the pedicle), the test of circulatory adequacy by means of the fluorescence method of Haynes and Macgregor, and the atropin test of Hynes.

With any method, of course, the surgeon will attempt to prevent tension on the flap, congestive edema of the newly implanted tissues, and the appearance of a hematoma. Infection will, of course, always be a possibility. JOHN W. BRENNAN, M.D.

The Treatment of Lesions Produced by Radium and Roentgen Therapy (Tratamiento de las lesiones producidas por la radium y roentgenterapia). ALBERTO G. ALBERTENGO. *An Cirug.*, Rosario, 1951, 16: 40.

The fundamental cause of radium and x-ray lesions is excessive application of high dosage. Occasionally, idiosyncrasy may be an important factor. In certain circumstances the type of lesion produced is inevitable, either because of the intensity of the disease process or the depth of the structure involved; however, in every case irradiation therapy should be administered with the utmost care in order to exclude any possible secondary lesion. When such a lesion has occurred, complete extirpation is probably the safest procedure, to be followed by some form of plastic replacement.

The author discusses 70 cases of x-ray lesions—82 per cent in women and 18 per cent in men. In 37 per cent of the cases the lesions were of the first and second grades and in 24 per cent the lesions were of the third grade. In 56 per cent of the cases, a tubular graft was employed; in 18 per cent a plain pedicle transplant was applied; in 9 per cent, free grafts were used; and in 10 per cent the lesions were covered with pinch grafts. In 1 case the hand was amputated; in another, a bone transplant was done for a nasal deformity. Six patients suffered general malignant changes. The histologic picture was that of a spindle-cell or basocellular epithelioma. The latent period of the disorder ranged from 9 to 19 years, respectively. The results of plastic surgery were encouraging, considering the extent and destructive character of the lesions.

STEPHEN A ZIEMAN, M.D.

Postoperative Changes in the Circulation and the Effects of Oxygen Therapy. LARS TROELL. *Acta chir. scand.*, 1951, 102: 203.

The postoperative alterations that occur in the central and peripheral circulation are related to the trauma to the organism. It has been observed that

following surgery many patients show evidence of circulatory insufficiency and a lowered cardiac output, although these changes may not be demonstrable clinically. The mechanism seems to be a slowing of the peripheral circulation with capillary stasis and decreased venous return to the heart.

In an effort to determine which circulatory changes take place immediately following surgery and whether it is possible to influence these changes therapeutically, a group of 23 patients on the surgical service at Karolinska Sjukhuset, Stockholm, were studied by means of the heart catheterization technique of Cournand. The patients were graded according to operative risk and the studies were performed before, during, and after operation.

After eliminating the probable difference that might occur in results preoperatively and postoperatively, certain significant circulatory alterations were observed to take place after operation:

1. Oxygen consumption increases with the increased operative risk of the patient, and oxygen therapy does not change this consumption.

2. The arterial oxygen saturation falls with the increased surgical risk of the patient, and the normal saturation can be re-established with oxygen therapy.

3. Venous oxygen saturation decreases somewhat after operation and, likewise, can be restored to normal values by the administration of oxygen.

4. The difference between the arterial and venous oxygen levels usually decreases.

5. The arterial and venous carbon dioxide values are increased with increased surgical risk. In these values oxygen therapy produces no significant changes.

6. The cardiac output usually increases in the patients with increased operative risk and seems to be in ratio to the degree of risk. The values do not change much after oxygen therapy.

7. The pulse rate increases by from 20 to 30 per cent as a rule. The blood pressure does not change significantly. However, some elevation of temperature occurs.

The changes in the oxygen content of the arterial blood are not considered to be of any great importance in patients with a normal peripheral circulation because even a small increase in the circulation can compensate for the decreased arterial oxygen content. On the other hand, patients with arteriosclerosis have a reduced capacity for adjustment of the peripheral circulation, and, as a result, latent circulatory insufficiency of some degree may be present. Thus, in arteriosclerotic areas the decreased oxygen content of the arterial blood is consequently not countered by a corresponding increase in blood supply. The damage may fall on the heart and central nervous system, which organs are particularly sensitive to hypoxemia. The studies seem to indicate the advisability of giving oxygen after operation to all patients with probable arteriosclerosis or other heart diseases, and especially to patients who are poor surgical risks.

JACOB T. BRADSHER, JR., M.D.

Volemic Substances for the Replacement of Blood. JESSE L. BOLLMAN, ROBERT C. KNUTSON, and JOHN S. LUNDY. *Arch. Surg.*, 1951, 63: 718.

Solutions of macromolecular substances have been used for the purpose of expanding the volume of plasma by virtue of their osmotic activity while they remain in the blood. Because of the large size of their molecules their diffusion from the blood is correspondingly reduced and their osmotic effectiveness prolonged. It is obvious that such substances do diffuse rather rapidly into the extravascular fluids and some are sequestered in specific tissue spaces. The rapid decline of their concentration in the blood after intravenous injection indicates that considerable portions have left the blood in a few minutes.

In their experiments the authors attempted to determine the relative effectiveness of dextran, polyvinyl pyrrolidine, and solutions of gelatin and acacia for restoration of the blood volume after hemorrhage produced experimentally. They found that each of these substances in proper concentration and volume was approximately as effective in the restoration and maintenance of the blood volume as was whole blood or plasma. The injection of saline solution (in twice the amount as the volume of the blood removed) produced only slight effects on the blood volume as compared to the injection of macromolecular solutions in the same amount as that of the blood removed. The addition of more fluid volume or saline solution to the macromolecular solutions further enhanced their effects.

Several macromolecular substances, when injected intravenously immediately after bleeding, are effective in replacing the volume of blood after measured amounts of hemorrhage. The extent and duration of the increase in blood volume is directly related to the amount of the substances administered, provided that the molecular size is sufficient to prevent rapid elimination. The volume of fluid administered is equilibrated with the blood and tissue fluids with extreme rapidity and the sustained increases of blood volume thus obtained are dependent on the degree of hydration of the extravascular tissues as well as that of the blood. The presence of macromolecular substances in the extravascular fluids appears to aid in the maintenance of volume of blood after hemorrhage.

The Surgical Treatment of Ventricular Fibrillation. JULIAN JOHNSON and CHARLES K. KIRBY. *Ann. Surg.*, 1951, 134: 672.

Ventricular fibrillation is a common terminal event in heart disease and has been observed in the recent scope of cardiac surgery. It is also closely allied to the problem of cardiac arrest.

The causes of ventricular fibrillation appear to be manipulation of the heart, or contact with its conduction mechanism, and anoxia. Coronary artery disease is undoubtedly a predisposing factor in some instances and at least one anesthetic agent, cyclopropane, has been under suspicion as well as other drugs which increase myocardial irritability.

The diagnosis of ventricular fibrillation is made by the sudden disappearance of a palpable pulse and audible blood pressure. An exploratory thoracotomy is the only real diagnostic measure available and must be performed immediately, unless the heart or a great vessel is palpable through an incision already having been made. If an electrocardiograph happens to be attached to the patient at the time of possible fibrillation, the diagnosis can be made immediately. The characteristic fibrillary twitchings are easily palpable upon opening of the chest. The classical comparison of fibrillation is holding a bag of wriggling worms. If the ventricles are not contracting effectively, cardiac massage should be started immediately, and no time should be wasted in palpating the heart when it is first exposed.

The authors present 10 cases of ventricular fibrillation. Four patients recovered completely. Three had been subjected to cardiac surgery, 2 to cardiac catheterization, 1 patient to thoracic operation, 2 patients to other operations, and 1 patient had been treated medically. In 4 patients the fibrillation occurred postoperatively in the ward. A definite relationship exists between cardiac arrest and ventricular fibrillation, according to the authors, because there is the coexistence of two of the principal causes of ventricular fibrillation, i.e., manipulation of the heart and anoxia. Seven of the patients who had cardiac arrest when the heart was first exposed did not have ventricular fibrillation until the heart was massaged. In view of the fact that ventricular fibrillation is closely associated with cardiac arrest, it is important to be prepared to defibrillate the ventricles whenever cardiac resuscitation is attempted.

The authors believe that the incidence of complete recovery from ventricular fibrillation should be higher than 40 per cent. The most important consideration in cardiac resuscitation is that adequate circulation produced by cardiac massage and adequate respiration produced by artificial ventilation of the lungs be established within about 4 minutes after the onset. An attempt to defibrillate the heart should not be done until the heart is well oxygenated. The essential points of cardiac massage are: (a) the rate of cardiac compression should be rapid—80 to 120 times a minute, (b) the venous return to the heart should be supplemented by moderately rapid intravenous administration of crystalloid solutions and blood, and (c) the cerebral circulation may be increased by intermittent occlusion of the thoracic aorta.

Procaine or pronestyl should be administered intravenously to decrease the myocardial irritability. This measure alone may cause reversion to the normal rhythm.

The technique of defibrillation of the ventricles by electric shock is the most reliable method. The apparatus used need not be elaborate; it is described by the authors.

The prophylactic use of drugs such as procaine and pronestyl during operation, to depress myocardial irritability, has been resorted to. The authors prefer pronestyl, which has appeared to be very promising.

The failures in the patients treated for ventricular fibrillation were due primarily to the delay in instituting resuscitative measures. Success will depend upon the promptness of the resuscitative measures and the restoration of adequate oxygenated blood to the brain within 3 or 4 minutes after the onset of the fibrillation. JOHN E. KARABIN, M.D.

ANESTHESIA

Pethidine and General Anesthesia. MICHAEL JOHNSTONE. *Brit. M. J.*, 1951, 2: 943.

The effects of pethidine on the various cardiac and respiratory dysfunctions associated with general anesthesia were studied in conscious subjects and in anesthetized patients. The tachypnea and ventricular arrhythmias associated with trichlorethylene anesthesia are due to retention of endogenous carbon dioxide. Pethidine abolishes and prevents these complications apparently by causing bronchiolar dilatation which ensures the efficient elimination of carbon dioxide.

In nonatropinized patients, pethidine appears to increase the sensitivity of the vagal pulmocardiac reflexes, which in turn increases the risk of cardiac inhibition.

In operations on atropinized patients not requiring profound muscular relaxation or entailing visceral traction, the use of pethidine with nitrous oxide, oxygen, and trichlorethylene is advocated as a safe and satisfactory method of anesthesia.

MARY FRANCES POE, M.D.

The Use of Hyaluronidase with Topical Anesthesia for Endotracheal Intubation. WILLIAM S. HOWLAND and E. M. PAPPER. *Anesthesiology*, 1951, 12: 688.

This study was undertaken to evaluate the action of hyaluronidase with topical anesthesia for endotracheal intubation. Ten turbidity reducing units (T R U) of hyaluronidase were added to each cubic centimeter of 2 per cent pontocaine solution. One hundred and twenty-five neurosurgical patients were studied in this series during endotracheal anesthesia with pentothal and nitrous oxide-oxygen (standard topical endotracheal technique was described). The clinical evidence obtained in this study indicated that hyaluronidase added to 2 per cent pontocaine shortens the time required for the onset of topical anesthesia in the respiratory tract; also, it decreases the total dose to a significant degree.

The mechanism by which hyaluronidase achieves the effects which were observed is open to speculation. It is suggested as a possible explanation that the ease of onset of anesthesia with smaller anesthetic doses may be associated with the dissolution of mucus by hyaluronidase; this exposes the mucosal surfaces more readily to the action of the topical anesthetic agent. Further corroboration of this assumption is based upon other observations of pa-

tients with excessive quantities of secretions from the respiratory tract resulting from disease of the central nervous system or pulmonary disease. In these patients satisfactory topical anesthesia with 2 per cent pontocaine requires three times the time and dose that are necessary with 2 per cent pontocaine—hyaluronidase mixtures. C. YEIN, M.D.

The Effects of Adrenaline, Noradrenaline, and Methedrine on the Renal Circulation During Anesthesia. H. C. CHURCHILL-DAVIDSON, W. D. WYLIE, B. E. MILES, and H. E. DE WARDENER. *Lancet*, Lond., 1951, 261: 803.

This report indicates that the assumption that raising the blood pressure by pressor agents will automatically restore the renal blood flow is unwarranted. Insulin and para-aminohippurate clearances have been estimated on 18 occasions in 14 persons before and after the administration of adrenaline, noradrenaline, or methedrine. The patients were anesthetized with ether or cyclopropane and on 10 occasions had been made hypotensive by the administration of pentamethonium bromide. The renal blood flow was reduced in all cases by adrenaline and noradrenaline, but increased in 5 of 6 cases by methedrine.

Confirmation of the effect of these drugs on the renal circulation in a shocked person would be desirable. MARY FRANCES POE, M.D.

Brachial Plexus Block Analgesia with Xylocaine. ERIK MOBERG and KARL-GUSTAV DHUNÉR. *J. Bone Surg.*, 1951, 33-A: 884.

The authors report the use of xylocaine in brachial plexus block analgesia. Xylocaine is the hydrochloride of diethylaminoacet –2.6– xylidide. It is reported to possess great chemical stability so that it can be boiled for hours and still remain stable for an indefinite period. A special method makes it possible to produce stable solutions of xylocaine and epinephrine which will retain their properties unchanged for years. The toxicity is said to be similar to that of procaine and the analgesic potency from two to four times as high.

The authors report 300 consecutive brachial plexus blocks of which 185 were done with procaine and 115 with xylocaine. The xylocaine dosage was from 10 to 15 c.c. of a 2 per cent solution containing epinephrine 1 to 80,000 and the procaine dosage was from 20 to 35 c.c. of a 2 per cent solution containing epinephrine 1 to 200,000. In 21 of the procaine cases and in 4 of the xylocaine cases additional anesthesia was needed.

The authors conclude that the use of xylocaine for brachial plexus block would seem to be a particularly effective method for obtaining good analgesia in the treatment of many hand cases, that the dosage can be kept down to half that of procaine with better analgesia and longer duration, and that there are no more, and probably fewer, complications than with procaine.

EDGAR L. RALSTON, M.D.

Mytolon Chloride: A New Agent for Producing Muscular Relaxation. Preliminary Report. JULIA G. ARROWOOD. *Anesthesiology*, 1951, 12: 753.

This article presents the clinical experience with a new 2, 5-bis-(3-diethylaminopropylamino)-benzoquinone-bis (benzyl chloride), mytolon chloride, which was recently synthesized and reported on by Cavallito, Soria, and Hoppe. Curariform activity is exhibited when the drug is administered by the oral, subcutaneous, or intravenous routes, and this activity varies considerably according to the species of experimental animal to which it is administered. Its potency exceeds that of d-tubocurarine chloride and its toxicity equals or is less than d-tubocurarine in equipotent doses. It causes no significant change in the pulse rate or the blood pressure, and has no direct cardiac toxicity. The vasopressure response is not inhibited, and it has no effect upon autonomic ganglia or upon the vagus nerve. Two hundred and fifty unselected surgical patients, for various types of operations, received mytolon chloride for muscle relaxation. Approximately one-third of the operations were laparotomies. The combination of sodium pentobarbitol, mytolon chloride, and atropine was administered for induction and intubation when necessary. Following intubation, anesthesia was maintained with ether, cyclopropane, or other maintenance agents.

The dose of mytolon chloride varies with the physical state of the patient and the type of surgical intervention and anesthetic agent employed. It ranged from 3 to 9 mgm. as an initial amount, with the addition of from 3 to 6 mgm. every 20 to 40 minutes to maintain consistent curarization. The speed of onset of muscle relaxation is comparable to that of d-tubocurarine. The maximum relaxation occurs in 12 to 15 minutes, and the effect apparently begins to recede soon after reaching its peak. Definite respiratory depression occurs with relaxation of the skeletal muscles adequate for intubation or abdominal explorations under light anesthesia. The extent of the depression is related not only to the size of the dose but also to the anesthetic agent. There has been no instance of prolonged respiratory depression in this series and there was no evidence of bronchoconstriction at any time following the injection. There was no change in the pulse rate or rhythm, and there was no evidence that there was any effect on the circulation even in the hypertensive patient. Mytolon chloride is capable of effecting complete myroneural block and muscular flaccidity. The degree of relaxation provided is indistinguishable clinically from that of d-tubocurarine chloride or decamethonium bromide. Respiratory depression is less marked when comparable degrees of relaxation are obtained during ether or cyclopropane anesthesia than during thiopental or hexobarbital anesthesia. Excessive salivation was an annoying complication. Recovery from anesthesia was not prolonged following the use of mytolon chloride. It is excreted in the urine. The agent interrupts the transmission of motor impulses at the

myroneural junction, and the degree of flaccidity produced depends upon the amount administered. No evidence of a deleterious effect upon the cardiovascular system was noted in this series of observations. MARY KARP, M.D.

The Role of the Anesthesiologist in Gastrointestinal Surgery. GRANT H. STONE. *Surg. Clin. N. America*, 1951, 31: 1657.

Present day anesthesia is a factor in the drastically reduced mortality and morbidity rates associated with surgery of the gastrointestinal tract. The adoption of new and better techniques and refinements of already existing techniques is the responsibility of the anesthesiologist.

Profound muscular relaxation associated with quiet respiration greatly facilitates intra-abdominal surgery. It is essential to recognize what constitutes muscular relaxation, how it is produced clinically, and, more important, the factors which may modify it. The anesthesiologist must determine how much relaxation can be safely provided in a given patient and by what method.

It should be recognized that complications which occur in the postoperative period might have been initiated during the anesthetic period. Many factors which operate during this period can easily act as exciting causes for postoperative mortality and morbidity.

A few of the diseases associated with a relatively high mortality and morbidity rate are discussed to demonstrate the type of problem posed by this surgery. Anesthetic management assumes tremendous importance in dealing with patients in poor condition because of toxemia, peritonitis, hemorrhage, or malignancy. The psychogenic and emotional components of chronic ulcerative colitis make preoperative and postoperative management of these patients difficult. MARY FRANCES POE, M.D.

Some Observations on Anoxia. B. G. B. LUCAS. *Anesthesiology*, 1951, 12: 762.

The exact biochemical change which takes place inside of the nerve cells of the brain under anoxic conditions is not known. All the evidence concerning pathologic dysfunction is based on histologic observation and this at best is a crude method and has many disadvantages.

The earliest change that occurs in the anoxic brain cell is an intracellular edema. If it is really reabsorbed, the cell recovers, but if it persists oxygen will be denied rapid access to the cell by purely mechanical means so that the anoxia becomes worse and a vicious circle is established which leads to death.

The treatment of edema of the brain cell involves withdrawal of fluid from the brain by hygroscopic or osmotic means. For this purpose the injection of concentrated human serum in a dose not exceeding 50 ml. per hour is the best method. Also procaine given intravenously and bilateral stellate sympathetic block or intravenous infusion of a weak solution of histamine may improve the blood supply to the brain.

In the treatment of cardiac arrest in anesthesia it is essential to obtain an adequate oxygenated cerebral circulation. Cardiac massage in the presence of ventricular fibrillation produces a very poor result. Methods of restoring normal rhythm include electric defibrillation, the application of ice to the fibrillating heart, and intra-arterial transfusion with oxygenated blood. MARY KARP, M.D.

PHYSICOCHEMICAL METHODS IN SURGERY

ROENTGENOLOGY

Electronic Amplification of the Roentgenoscopic Image. Present Status of Moon's Scanning Tube Method. PAUL C. HODGES and LESTER S. SKAGGS. *Am. J. Roentg.*, 1951, 66: 705.

A progress report is made of the Robert J. Moon project, which has for its undertaking the development of electronic amplification of the roentgenoscopic image. Although the advances have been encouraging, the instrument is not yet ready for commercial use.

From the authors' experience it would seem that the real problem is the concentration of the electrons in a very small point rather than the design of a target that will withstand the heat produced by them.

The size of the roentgen ray beam is determined by the size of the pinhole in the lead barrier and its distance from the target of the x-ray tube. A larger pinhole makes for fluctuation of low roentgen-ray quanta in the scanning beam but this must be balanced against the benefit of higher resolving power which requires a small pinhole; 100 microns seem to be a reasonable compromise. The optimum integrating time is 0.2 of a second, which value adapts well to human visual physiology.

Moon designed a high current and voltage tube around the Pierce electronic gun. This tube has a plane surface to its target since the long focal length of the tube does not cause the beam to suffer much defocusing with deflection over the surface of the target. The useful x-ray beam is emitted at an angle to the electron beam passing out through a thin foil in the anode cone and through a beryllium window in the outer envelope. These images would suffer a rather pronounced keystone deformity but special scanning circuits compensate for this.

Details of the Pierce gun are shown in a cross-section drawing and are discussed. As a result of the high potentials used and the shape of the electrodes, a parallel beam of fast electrons flows through a first and a second anode into a tubular field-free space between the second anode and target where, because of the mutual repulsion of electrons, the beam in the field-free space diverges into a cone, the base of which is about 0.5 cm., and the focal spot varies between 100 and 25 microns. The nominal rating of the first gun received was 40 ma., but it is believed that it can be operated at least for experimental work at 100 ma.

With the advent of growing large flawless calcium fluoride crystals, one may expect to achieve synthetic crystals 15 cm. in diameter which will provide the desired 4 by 4 inch scanning surface.

An imported end-window photomultiplier tube has become available which eliminates a lens system that would otherwise be needed to concentrate the light from the detector screen onto the photomultiplier tube.

The viewing screen for observing the x-ray image is a 10-inch kinescope of conventional television type. Methods for enhancing the image intensity by using either a slow phosphor or memory tube are explained. Moon intends to reduce the "flicker" by combining the memory and kinescope tubes.

Although the present image is poor and the x-ray to light conversion is inefficient, the authors are of the opinion that only the future can foretell whether this step is one in the right direction.

EDWARD D. HUDACK, M.D.

Suprasellar Tumors with Calcification. ERIK LINDGREN and GIOVANNI DI CHIRO. *Acta radiol.*, Stockh., 1951, 36: 173.

A correct diagnosis of location of a suprasellar lesion is generally easy. Primary optic atrophy, visual field distortions, sellar changes, suprasellar calcification, oculomotor palsies, signs of dyspituitarism, and so on, taken together constitute a syndrome pointing unmistakably to the suprasellar region. On the other hand, preoperative diagnosis of the morbid nature of the process is far more difficult.

The authors present a series of 54 cases of craniopharyngiomas; calcification was present in 30 (54%). In reviewing 238 cases gathered from the literature, the authors found suprasellar calcification in 139 (58%).

Suprasellar calcification is by no means pathognomonic of craniopharyngiomas. Suprasellar gliomas, chordomas, suprasellar meningiomas, pituitary adenomas, cholesteatomas, aneurysms of the internal carotid artery and its branches, and old hematomas may also show suprasellar calcification.

The authors divide the calcifications of craniopharyngiomas into three types: (1) nodular, (2) cystic, and (3) mixed. Calcifications of the nodular type may be found in suprasellar gliomas (optic and hypothalamic). In a series of 14 such tumors, 7 were calcified. Differential diagnosis is only possible with pneumography. Cystic calcifications seldom appear in pituitary adenomas. In a total of 345 cases they were present in only 3 per cent, and in the authors' series they were always situated as a projection upwards of the dorsum sellae. Suprasellar meningiomas, chordomas, cholesteatomas, and aneurysms are easier to differentiate because of the typical appearance of the calcifications and their situations.

FRANK L. HUSSEY, M.D.

Early Roentgen Diagnosis in Acute Bleeding from the Upper Gastrointestinal Tract. MAX RITVO, THOMAS P. COTTER, and NORMAN ZAMCHECK. *Am. J. Roentg.*, 1951, 66: 728.

A report is presented of 52 roentgen examinations of the gastrointestinal tract made during the acute

gastrointestinal hemorrhage. Upon admission to the hospital, patients were given immediate emergency treatment such as shock therapy and the administration of blood. On the following morning, roentgen examinations were made of all patients except those presenting the following conditions: (1) severe hemorrhage that morning; (2) shock; (3) inability to co-operate; and (4) serious medical complications.

During the roentgen examination, a close check on the pulse and blood pressure was made, to detect the possibility of shock during the examination.

X-ray studies were individualized to the case, being as detailed as possible. Examinations were made in the erect position whenever possible, and were completed in the supine position. Multiple spot films were taken of the esophagus, stomach, and duodenum. Palpation was used with care in selected cases. As a rule, thin mixtures and a small amount of barium were used. Thick barium was used in cases of suspected varices.

There were only 4 cases of shock among the 52 cases reported. One patient vomited blood and another passed bloody stools the remainder of the day; however, the authors could not be certain that the x-ray examination and manipulation were actually the cause of these sequelae.

The authors maintain that early x-ray examination in acute gastrointestinal bleeding is a valuable adjunct to the diagnosis and is not necessarily hazardous. MAURICE D. SACHS, M.D.

The Roentgen Diagnosis of Acute Abdominal Conditions. LEAH SHORE FINKELSTEIN and ARTHUR FINKELSTEIN. *Surg. Clin. N. America*, 1951, 31: 1603.

The roentgenographic examination of the patient presenting an acute abdominal condition is an emergency procedure. It is well known that the mortality rate in intestinal obstruction increases rapidly if necessary treatment is delayed. The author discusses the more important conditions that the patient presents in acute abdominal pathology.

Intestinal obstruction is frequently qualified by the adjective "dynamic" to indicate mechanical obstruction, and "adynamic" or "paralytic" to indicate the absence of peristalsis. Preliminary x-ray examination should consist of anteroposterior exposure while the patient lies supine, plus a second exposure in the anteroposterior projection when the patient is standing erect or lying on his left side.

Early mechanical obstruction of the small intestines may be manifested by a single distended loop proximal to the site of obstruction. This segment may be bent upon itself, giving rise to the appearance often termed a "hairpin loop." As time passes, a longer section of intestine becomes distended. These dilated loops tend to be arranged transversely in the abdomen, producing a "stepladder" configuration. In early cases the roentgen findings may be too minimal to warrant a diagnosis. As the condition advances, a continuous loop of distended bowel extending without interruption from the site of obstruction may be seen.

Fluid levels in the dilated loops are easily detected in films exposed when the patient is in either the erect or lateral decubitus positions. The wall of the gas-distended small bowel is thin, so that the gas shadows in loops pressed against each other are separated by a thin line. The presence of peritoneal fluid or thickening of the wall by edema or inflammation produces a wider separation between the gas shadows. It is of extreme importance to realize that late stages of mechanical obstruction of the small bowel may be complicated by paralytic ileus, in which case gaseous distention of the colon may appear.

Under circumstances of distention of both the large and small bowel, a roentgen diagnosis of mechanical small intestinal obstruction may not be possible unless there has been careful correlation with the clinical course, or unless progress films made prior to the onset of paralytic ileus are available for comparison. The distended small intestines tend to be more centrally located in the abdomen, and arranged so that the long axes of the loops lie transversely. The distended colon is situated ordinarily around the periphery of the abdomen, the long axes being vertical in the regions of the ascending and descending segments. In the dilated jejunum the Kirkring's folds appear as straight linear radiopacities crossing the lumen of the bowel at 0.5 to almost 1 cm. intervals. In the ileum these folds may spread farther apart, but in many cases they are obliterated by the increased intraluminal pressure. In the distended colon the haustral markings are preserved. It is usually inadvisable to give barium by mouth, because its progress is too slow. Barium enema studies of the colon may be necessary, or injection of the small intestines via a Miller-Abbott type of tube.

Strangulation consists in an obstruction of the lumen at two sites, plus venous obstruction and a varying degree of arterial occlusion. Immediate spasm of the strangulated loop and also of the gut above and below it may occur. Distention above the obstruction does not take place until retrograde venous thrombosis has occurred or peritonitis has supervened. The venous thrombosis may occur proximal or distal to the obstruction, and therefore the distention may be proximal or distal to the primary lesion. The bowel usually contains fluid and little, if any, gas; there may be a lack of roentgenographic evidence of strangulation. In mechanical obstruction of the colon the large bowel distends with gas above the site of obstruction. Some trace of the haustrations is retained so that by their configuration and the location of the dilated bowel the distention can usually be identified as of the colon. Fluid-air levels are usually noted in exposures made in the erect and lateral decubitus positions. In favorable circumstances the dilatation is visualized as extending down to the site of the lesion, not only permitting definite localization but at times revealing a soft tissue mass, the significance of which cannot be determined. A right lateral decubitus film

may be of value in demonstrating the site of obstruction in the descending portion of the colon. An obstructing lesion in the sigmoid or rectum tends to be pushed down into the pelvis by the distended descending colon. The distended sigmoid portion of the colon may be pushed down into the pelvis, simulating gas in the rectum. A barium enema may be given in order to determine not only the exact site of obstruction but in many instances also the nature of the lesion. Small bowel dilatation may occur in obstructions of the colon and thus the findings of paralytic ileus may be simulated.

A colonic obstruction and a competent ileocecal valve results in a closed loop type of obstruction. Dilatation in this loop is usually greatest in the cecum. Volvulus may occur in the small bowel, but its recognition is usually difficult. Volvulus in the sigmoid and cecum are more easily recognized. In volvulus of the sigmoid there is tremendous dilatation of the twisted loop which pushes well out of the pelvis, almost always toward the right, and may extend to the liver edge or often up to the diaphragm. An important feature is the large accumulation of fluid in the sigmoid. Volvulus of the cecum occurs rarely. It is visualized as a greatly gas-distended viscus usually situated in the left abdomen. Usually, dilatation of the small intestine is associated with it.

Intussusception generally originates in the ileocecal area. The diagnosis usually requires a barium enema. The obstructing lesion is often a rounded soft tissue mass (intussusceptum) producing a concavity at the head of the barium column. Frequently a small amount of barium will enter the narrow sleevelike space between the intussusceptum and intussuscipiens, producing annular streaks of barium around the filling defect characteristic of intussusception.

Paralytic ileus is a functional disorder of the intestinal tract in which there is stasis of the intestinal contents. It results from some influence originating external to the intestine itself, interfering with its physiologic efficiency, and starting a train of events similar to those associated with mechanical ileus. In paralytic ileus it is widely accepted that there is usually distention of both the small and large bowels. Early in the course of the illness the dilatation is caused by gas; later, by gas and fluid. At first the gas is seen scattered throughout the intestinal tract rather than in one continuous loop such as often occurs after mechanical obstruction. Later, the distention may progress to the extent that the intestinal coils assume transverse positions in the abdominal cavity. Paralytic ileus is not always generalized. It may be local, involving the small intestine or colon or only segments of each. This localized type is seen as the result of localized intra-abdominal inflammations.

In acute gallbladder disease and acute appendicitis a single loop of distended ileum may be persistently present, and is referred to as the "sentinal loop." In acute pancreatitis, distention of the transverse colon or localized loops of small intestine may simulate mechanical obstruction. When paralytic ileus is associated with a generalized peritonitis the distended loops are often separated from each other by fluid or other exudate. There is a tendency for the loops of the small intestine to become adherent and fixed in position because of plastic exudate. Elevation and limitation in motion of both diaphragms occur in peritonitis, but they are also present when the abdomen is markedly distended because of mechanical obstruction alone. When vascular occlusion of the mesenteric vessels occurs, there is usually dilatation of the involved segment. When vascular accidents occur there is usually gas in the large and small bowels. Spastic ileus is a rare cause of obstruction of the intestinal tract due to regional spasm which usually occurs in the distal ileum, according to Zimmerman. A differential diagnosis of ileus and its complications on the basis of scout films may be difficult. Repeat examinations during the course of illness are of value.

The most common lesion causing pneumoperitoneum is a perforated peptic ulcer; rarely does other inflammatory or neoplastic involvement of the gastrointestinal tract rupture. Free air in the peritoneal cavity may appear after insufflation of the fallopian tubes, traumatic rupture of a viscus, and infection due to gas-forming organisms. Usually only a small quantity of gas has escaped, and it can be visualized only when the patient is roentgenographed in the erect or left lateral decubitus position. When the patient is in the erect position, the air accumulates most often in the right upper quadrant between the right diaphragm and the dome of the liver, often forming a thin crescentic shadow. Rarely the air may be seen under the left diaphragm. The site of perforation cannot be determined by scout film examination. Failure to visualize evidence of perforation may be due to the fact that an insufficient amount of air has escaped, or that a small amount escaped but was immediately loculated where it was obscured by intestinal shadows, or that too long an interval elapsed between the accident and the x-ray examination.

Intra-abdominal abscesses infrequently contain air which appears as a result of fistulous communication with an air-containing viscus, or by the action of gas-forming organisms. Such gas collections usually produce small or bubblelike radiolucencies and are likely to be obscured by the adjacent gastrointestinal shadows. The biliary tract may be outlined by gas and spontaneous fistulas between the biliary tract and the duodenum, stomach, or colon, or even the bronchial tree, usually as the result of erosion of a gallstone. Various portions of the biliary tract may be visualized, including the gallbladder. At times gas-forming organisms give rise to the same picture, and may produce emphysematous cholecystitis.

A subphrenic abscess is a common diagnostic problem. Fixation of the diaphragm occurs on the side of the lesion, but elevation is more common on

the right side than on the left. Actually, the diaphragm is often obscured by pleural effusion which occurs in 25 to 30 per cent of the cases. Intra-abdominal abscesses other than subphrenic, whether intraperitoneal or retroperitoneal, are seldom diagnosed by scout films unless they reach such large proportions that they are outlined as a soft tissue mass by the displaced intestinal loops, or they contain enough gas to permit identification. In attacks of acute cholecystitis the gallbladder is sometimes identified as a large globular soft tissue mass because of hydrops, empyema, or adherence of the surrounding omentum.

In the diagnosis of pancreatitis, scout films are only rarely of value. The recognition of calculi or calcifications in the region of the pancreas may draw attention to the possibility of pancreatitis. Unless it contains calculi, the appendix is not seen on scout films. In traumatic rupture of the spleen the finding of enlargement or obliteration of the splenic outlines is of value. The presence of perinephric abscess may be suspected if one kidney is enlarged and indistinct, the corresponding psoas muscle shadow is indistinct, and there is scoliosis of the lumbar spine with concavity toward the affected side. None of these findings are diagnostic. Ten per cent of urinary calculi are radiolucent and will not be visualized on scout films. In traumatic rupture of the kidney an intravenous urogram or retrograde pyelogram may reveal oozing of the contrast material into the perirenal spaces.

FRANK L. HUSSEY, M.D.

Premalignant Lesions of the Gastrointestinal Tract. ROBERT P. BARDEN. *Am. J. Roentg.*, 1951, 66: 915.

Cancer of the stomach is known to be one of the great killers of our day. In spite of outstanding surgical efforts in a few large medical centers, the over-all absolute 5 year survival rate for the country as a whole is about 5 per cent, and it seems unlikely that any significant improvement in the survival rate will be made for a long time to come.

The diagnosis of carcinoma of the stomach is almost entirely a roentgenological problem. The author presents 6 cases to show the relationship of chronic hypertrophic gastritis and cancer of the stomach.

Chronic hypertrophic gastritis represents an irritative state which is probably irreversible. When carcinoma develops in association with chronic hypertrophic gastritis, it may spread extensively throughout the submucosa of the stomach without producing ulceration or a projecting tumor. In some instances, it is impossible to distinguish chronic hypertrophic gastritis from carcinoma of the stomach. Furthermore, an unpredictable number of patients with hypertrophic gastritis of several years' duration will develop carcinoma. For these reasons prophylactic gastrectomy should be considered in all patients with this premalignant lesion.

FRANK L. HUSSEY, M.D.

Roentgen Demonstration of the Venous Circulation in the Liver: Portal Venography. GEORGE E. MOORE and RICHARD B. BRIDENBAUGH. *Radiology*, 1951, 57: 685.

Vasography has proved to be one of the most fruitful fields of roentgen investigation in recent years. Following preliminary animal and autopsy studies, portal venographic examinations were performed at the University of Minnesota Hospital, Minneapolis, as an incidental procedure during various surgical operations requiring laparotomy.

The technique used was the insertion of a polythene catheter into one of the tributaries of the portal vein, usually the right gastroepiploic. After insertion, the catheter was advanced proximally into the portal vein and tied in place. Twenty cubic centimeters of 35 per cent diodrast were then injected through the catheter as rapidly as possible. Roentgenographs were made immediately on completion of the injection. Satisfactory portal venograms were obtained.

Good contrast filling of the portal radicles of the right lobe of the liver was, as a rule, more constant than good filling of both lobes. Filling of the portal radicles of the left lobe with poor filling of the right lobe of the liver was not observed. These observations might have been due to the previously stated concept of streamline flow in the portal vein.

There were no serious reactions or complications resulting from portal venography. The experience gained in the investigations tended to indicate that portal venography is a technically feasible procedure and is relatively safe. Further experience in pathological conditions of the liver may prove the practicability of portal venography as a diagnostic procedure.

FRANK L. HUSSEY, M.D.

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Portal Venography. CHARLES G. CHILD, III, WARD D. O'SULLIVAN, MARY ANN PAYNE, and ROY D. MCCLURE, JR. *Radiology*, 1951, 57: 691.

Portal venography for studying circulatory changes in the portal venous system has proved satisfactory both in experimental animals and in man. It has been performed in more than 30 Macaca mulatta monkeys weighing from 10 to 20 pounds without any fatalities or hepatic damage when from 15 to 25 ml. of 35 per cent diodrast has been used. Two animals in which 50 ml. of 70 per cent diodrast were employed died.

Portal venograms have been obtained of 21 patients during the course of abdominal surgery. Fourteen of the films obtained were interesting and were reviewed. In all of the human cases recorded the superior mesenteric vein was isolated at the base of the mesocolon and the injection was given with a No. 15 gauge needle. Forty milliliters of 35 per cent diodrast were used in all of the cases but one, in which 50 ml. of 70 per cent diodrast were used. The contrast medium was injected manually from a 50 ml. Luer-Lok syringe as rapidly as possible. There were no fatalities. The spinal manometer was used

as an integral part of the equipment. Roentgenograms were obtained as the last few milliliters of contrast substance were being injected.

The cases reviewed were of a varied type. In several instances, particularly in the patients with pancreatic cancer, this form of angiography was demonstrated to be of value. The final evaluation of diagnosis by means of portal venography as described must await the accumulation of additional experience. FRANK L. HUSSEY, M.D.

Urethrocystographic Studies of Nervous Disturbances of the Urinary Bladder and the Urethra. G. GIERTZ and K. LINDBLOM. *Acta radiol.*, Stockh., 1951, 36: 205.

This paper was read before the Staff of the Mayo Clinic on September 19, 1950. It deals with the results of a roentgenographic method of examination which was initiated at the Karolinska Sjukhuset, Stockholm, Sweden, in 1940. The detailed technique was described by Edling in 1944.

The method consists of taking roentgenograms during micturition, supplementary to the ordinary retrograde urethrocystography. It is necessary to obtain these roentgenograms even if no urine or only a few drops of urine are passed on micturition. In certain instances the detrusor muscles must be stimulated by drugs to induce evacuation of the bladder. The voiding roentgenograms are usually taken in the erect position which facilitates micturition. When the bladder is atonic, air may be injected in addition to the opaque substance, to produce an increase in its distention and thus start the urinary stream.

Owing to the relative infrequency of cases available for such examination, the authors believe that their material is still too small to permit them to draw final conclusions; therefore the present report is considered only preliminary. It is based on a study of 79 patients with nervous disturbances of the bladder and urethra, in 37 of whom the level of the lesion in the nervous system was definitely known.

Four types of urethrocystographic images are distinguished: (1) the supranuclear type, including cerebral lesions and spinal lesions above the bladder centers; (2) the infranuclear type, including spinal lesions below the bladder centers, mainly lesions of the cauda equina; (3) the enuresis type; and (4) the atonic type. The appearances in these four types are described in detail and illustrated with reproductions of characteristic roentgenograms and schematic diagrams.

The spinal cord centers of the bladder innervation are placed at the levels of D 12 and L 1. Lesions above D 12 always yielded typical roentgenograms of the supranuclear type of bladder. Of 7 patients, however, whose lesions corresponded to the levels of D 12 and L 1, only 5 exhibited the typical infranuclear type of bladder. In the remaining 2, the appearance was somewhat different, a fact which made the authors suspect that there may also be a separate nuclear type of bladder.

In the enuresis type of bladder, the appearance during micturition was similar to that seen in patients with lesions above D 12. This observation may indicate that true enuresis nocturna is caused by lack of cerebral control of the spinal cord centers of the bladder. The retrograde urethrocystograms in enuresis nocturna, however, had a normal appearance whereas in lesions above D 12 the bladder was permanently round, had a moderate capacity with a decreased tendency to open the bladder neck, and did not change its shape during voiding. In contradistinction to this, the infranuclear type of bladder had a "pine-tree shape" with a "funnel urethra" terminating with a marked narrowing of the lumen at the level of the external sphincter.

The atonic type of bladder is not caused by a lesion of the cerebrospinal nervous system but is encountered in such varied conditions as pregnancy, labor, abdominal operations, and especially following surgery in the lesser pelvis.

The authors have also studied the mechanism of the spasm of the external sphincter muscle associated with the infranuclear type of bladder. They found that the spasm ceased after intramuscular injection of etamonin, and decreased considerably after paravertebral injection of novocain in the lumbar region, indicating that the sphincter-closing reflex passes through the paravertebral part of the autonomous nervous system. This spasm is responsible for the marked trabeculation of the infranuclear type of bladder. There is an equivalent spasm of external sphincter of the anus, demonstrable by anography. T. LEUCUTIA, M.D.

Discography of Dissecting Transosseous Ruptures of Intervertebral Discs in the Lumbar Region. K. LINDBLOM. *Acta radiol.*, Stockh., 1951, 36: 12.

The persistent epiphyses or intercalary bones of the vertebral bodies were thought to have originated from the marginal epiphyses. However, Schmorl and Junghanns claimed (on the basis of their anatomical studies) that the condition was due to separation by a long-standing protrusion of the intervertebral disc.

Recently discography has been used to study the cause of persistent epiphyses. In the antomical specimens, as well as in 5 patients, the contrast medium spread through an anterior rupture of the intervertebral disc into the so-called epiphyseal line.

Persistent epiphyses may also occur posteriorly. In such instances they are due to a posterior rupture of the intervertebral disc with involvement of the adjacent vertebral body, protruding into the spinal canal.

The clinical significance of dissecting transosseous ruptures of the intervertebral disc (persistent epiphyses) is unknown. Anterior disc rupture with persistent epiphyses may possibly cause abdominal pain, whereas a residual posterior epiphyses may produce symptoms by pressure on the posterior longitudinal ligaments and adjacent nerve structures.

MAURICE D. SACHS, M.D.

Calcifications of the Intervertebral Discs and the Relationship Between Various Types of Calcifications in the Soft Tissues of the Body. CARL SANDSTRÖM. *Acta radiol.*, Stockh., 1951, 36: 217.

For many years it was customary to divide the calcifications of the soft tissues of the body into (1) metastatic and (2) dystrophic; however, since roentgenographic examination does not permit a differentiation between these two types, the author suggests a new classification based on the permanence of the calcifications, which can easily be determined by control studies.

The following is the author's classification of the long list of calcifications of the soft tissues of the body which may be encountered on the roentgenogram under various pathologic conditions, excepting the calcifications of the secretory glands and tumors:

GROUP I. PERMANENT CALCIFICATIONS

1. Calcifications in various cartilaginous tissues
   (a) In hyaline cartilage: of the ribs, sternum, nose, larynx, trachea, bronchi, joints, and cartilaginous plates of the intervertebral discs
   (b) In fibrocartilage: of the articular discs, menisci, and the annulus fibrosus
   (c) In elastic cartilage: of the ear, eustachian tube, and larynx
2. Calcifications in the vessels
   (a) In arteriosclerosis and syphilis
   (b) In toxoplasmosis
   (c) In thromboses of earlier date
3. Calcifications in the lungs, lymphatic glands, and serous membranes
   (a) In tuberculosis
   (b) In coccidiomycosis, histoplasmosis, blastomycosis, aspergillosis, moniliosis, and other mycoses
4. Calcifications in the connective tissues
   (a) In calcinosis circumscripta
   (b) In calcinosis universalis
   (c) In lipocalcinogranulomatosis
   (d) In hyperparathyroidism
   (e) In certain rare diseases: osteitis fibrosa cystica, pseudohypoparathyroidism
   (f) In the dura mater of brain, of unknown etiology
5. Calcification in the heart muscle
6. Calcifications in the brain: hypoparathyroidism, toxoplasmosis

GROUP II. IMPERMANENT CALCIFICATIONS

1. Calcifications induced by toxic doses of vitamin D
2. Calcifications in tendons and muscles observed in myotendinitis calcarea
3. Calcifications of unknown etiology in the intervertebral discs in childhood

The author emphasizes that this classification should not be regarded as definitive since certain calcifications now included in the permanent group, as, for example, the calcifications in hyperparathyroidism, may absorb following adequate treatment.

The calcifications in the intervertebral discs may belong in both of the aforementioned groups. As is known, the disc consists of (1) an upper and lower cartilaginous plate, (2) a peripheral annulus fibrosus, and (3) a central nucleus pulposus. The calcifications seen in the cartilaginous plates and the annulus fibrosus, or, in other words, in the peripheral portions of the disc, are of the permanent type, whereas the calcifications found in the central nucleus pulposus and adjoining part of the annulus fibrosus (which microscopically has a structure similar to that of ordinary tendinous tissue) are both permanent and impermanent in nature.

The author presents briefly the case histories of two patients who had impermanent central calcifications, caused probably by myotendinitis calcarea, and of one patient who had permanent peripheral calcification without clinical significance. He believes that a distinction between the two types is desirable from the point of view of clinical diagnosis and therapeutic management. T. LEUCUTIA, M.D.

A Phlebographic Study of Constrictive Processes in the Superior Vena Cava Arena and of Accompanying Changes in the Collateral Circulation. ERNST F. SALÉN. *Acta radiol.*, Stockh., 1951, 36: 81.

The author discusses the clinical picture seen in occlusion of the superior vena cava. He suggests that mediastinal phlebography with simultaneous roentgenology in perpendicular planes might aid in determining the degree of stenosis and estimating the course of the collateral circulation.

He has made 27 mediastinal phlebographic studies and complemented these with retrograde phlebography when necessary. The causes of the stenosis were intrathoracic tumors, thrombophlebitis, or systemic diseases such as Hodgkin's disease or lymphosarcoma. In the majority of cases the extent of the stenosis was determined.

The anatomy of the collateral circulation is described. It is thought to be most commonly through a deep system of veins, the azygos system, and less often through a superficial group which includes the internal mammary veins. In one-third of the cases the collateral circulation was demonstrated.

Three cases are described and roentgenograms illustrating the phlebographic findings are included in the original article.

NORMAN J. WINSTON, M.D.

The Efficiency of the Roentgen Paper Negative (Ueber die Leistung des Roentgenpapiers). OTTO WILLBOLD. *Muench. med. Wschr.*, 1951, 93: 1944.

The efficiency in roentgenologic work of the paper negative as a substitute for the ordinary celluloid film is of interest because of the enormous saving in cost to large institutions. This is particularly important in Germany because of shortages being experienced at the present time. The celluloid film (Agfa roentgen superspecial film) considered here is, of course, covered with the photographic emul-

sion on both sides; there is the basal, or bearing, layer of celluloid, covered on both surfaces with the photographic layers which, in turn, are covered by the protective layer. The paper negative is covered on one side only with the photographic emulsion, and this in turn is covered by the protective layer; however, between the paper and the emulsion (Agfa Roentgenpapier) is a thin film of an impervious and reflective barytes.

The comparative degree of blackening of the two forms of photographic reproduction varies at the different levels of light or radiation quantity and intensity; however, in general, one may say that it requires a time exposure for the paper negative which is approximately twice as long as that for the Agfa special celluloid film. This lag in time would, of course, be a disadvantage where extreme speed of exposure is required (in tachycardia and hyperperistalsis), and the contrast between blackening and the shadow-deficient areas is not so sharp with the paper negative as with the celluloid film. This is true even when the paper negative is read by transillumination instead of by means of ordinary daylight, although, under transillumination, the definition of details is much better.

Practically, the author has been using the paper negative in roentgenologic diagnosis in about 90 per cent of the cases in his institution—in the main, in exposures of the lungs inclusive of the frontal projection, aimed exposures and tomographic work, distant exposures of the heart, exploratory exposures of the abdominal region, examinations of the gastrointestinal tract with the use of contrast material, examination of the bile passages, and of the excretory urinary passages. Finally, the paper negative is used for almost all exposures of the skeleton.

The lung exposures are shortened as much as possible, and are developed for only 5 to 6 minutes. In this manner it is sought to procure a roentgen image which is rich in detail, yet not so rich as to produce the effect of over-superposition. Particularly in the tomographic work is this principle to be adhered to.

In the abdominal work, also, overexposure is to be guarded against; here the lessened superblackening (resulting from the wealth of details overlying one another), is more valuable in the diagnostic sense. The skeletal exposures must, however, receive plenty of exposure in order to bring the bone structure to satisfactory depiction.

The roentgen celluloid film is reserved for all those exposures in which the density difference in the tissues is insufficient for the paper negative to be effective, or in which a rapid inherent motion in the object to be photographed requires the highest degree of sensitivity, the highest grade of blackening-contrast, and the greatest amount of adaptation to the corrective possibilities of the subsequent developing process. In this category are included the lung exposures with large size of the object to be depicted, the exposures with hard rays (inclusive of bronchography), tomography through heavy layers of tissue, aimed exposures of the gastrointestinal tract in extremely heavy patients, exposures of the skull in the search for fracture lines, and the skeletal exposures for the depiction of initial changes in bone-destroying processes. JOHN W. BRENNAN, M.D.

Orbital X-Ray Therapy of Progressive Exophthalmos. ARTHUR JONES. *Brit. J. Radiol.*, 1951, 24: 637.

From time to time cases of Graves' disease occur in which the ophthalmic manifestations are prominent and out of proportion to the metabolic disturbance. Progressive exophthalmos is predominantly a disease of middle life, and males are affected in a greater proportion than in exophthalmic goiter. It may arise spontaneously, or after thyroidectomy. In the former case the history is often that of increasing discomfort and prominence of the eyes for several months, with diplopia, or of recent increase in an exophthalmos of several years' duration. In the series of cases reviewed by the author, the length of ocular history varied from 3 months to 2 years in the spontaneous cases.

After partial thyroidectomy for hyperthyroidism, the malady is manifest usually as an exacerbation of pre-existing exophthalmos, which may happen from a few weeks to 6 years after the operation. The exophthalmos may be unilateral, or, if bilateral, may be asymmetrical. Lid retraction is rare, and even ptosis may occur. Conjunctivitis follows progression of the exophthalmos, and if corneal covering is inadequate, exposure keratitis and ulceration threatening vision may supervene. Apart from the exophthalmos there exists, as an integral part of the disorder, a condition of edema of the orbital and periorbital structures.

It is generally agreed that the exophthalmos of Graves' disease is not due directly to the hyperthyroidism. Exophthalmos cannot be induced by giving thyroid to a normal animal, neither is it always present even in severe hyperthyroidism. It may appear for the first time after subtotal thyroidectomy, or if it is present before operation it may become worse after operation. Important histological features are lymphocytic infiltrations and chronic edematous changes in the orbital tissues; their radiosensitivity forms the basis for orbital x-ray therapy.

Clinical improvement has been obtained in the majority of 22 patients with true "progressive exophthalmos," who were treated by irradiation, but not in 7 patients with thyrotoxic exophthalmos.

Deep x-ray therapy (190 to 250 kilovolts, 15 milliamperes, high value layer 1.3–1.85 mm. of copper, 25–60 mm. focal skin distance) was used in all cases. The fields used were mainly anterior and lateral orbital. The anterior field was 8 by 6 cm. from the supraorbital ridge down to the malar region and the lateral field was 4 by 6 cm. restricted to the bony orbit. The daily dosage has been small throughout, usually from 50 to 100 roentgens, and occasionally 200 roentgens. In bilateral disease, one of the four fields were treated daily; in unilateral disease, treat-

ments were given twice a week. The total skin doses per field have varied during the series from 200 roentgens in 56 days to 1,000 roentgens in 14 days, frequent figures being, e.g., 200 roentgens in 26 days and 400 roentgens in 40 days. The optimal field dose would appear to be of the order of 200 to 400 roentgens in 4 to 6 weeks in the mild and moderate cases, but frank malignant exophthalmos requires up to 900 roentgens in 6 weeks for its control.

Reaction to the treatment consisted only of a mild conjunctivitis which lasted 2 or 3 weeks. The best results occurred in the cases of malignant exophthalmos. In general, the results were proportional to the severity of the case. A review of these patients shows that useful vision and the integrity of the eye may be saved by suitable irradiation. Accurate diagnosis of the type of disorder before irradiation in any particular case is important.

FRANK L. HUSSEY, M.D.

MISCELLANEOUS

The Treatment of Multiple Myelomas with Radioactive Phosphorus. E. LINDGREN, I. BERGSTRÖM, and G. WIHMAN. *Acta. radiol.*, Stockh., 1951, 36: 49.

The authors give a brief review of the therapy of multiple myelomas with roentgen therapy, stilbamidine, antimony, urethane, radioactive phosphorus, and nitrogen mustard. They believe that nitrogen mustard has no place in the treatment of this disease. Roentgen therapy has its best use in this condition in the treatment of localized areas of bone destruction. The other mentioned methods of therapy have no apparent effect on the roentgenographic signs of skeletal changes. Antimony, stilbamidine, urethane, and radioactive phosphorus have all been reported to give varying degrees of relief of the pain in some cases.

The authors report 4 cases in which the patients were treated with radioactive phosphorus and in which careful and repeated examinations of the bone marrow were made. Rapid alleviation of pain was observed in every case following treatment. Qualitative and quantitative changes were observed in the bone marrow for as long as several months following dosages (2 to 3 mc.) of radioactive phosphorus. There was observed in the bone marrow a decrease in plasma cell elements with a particularly striking decrease in the number of immature and multinuclear cells. None of these 4 treated patients showed an increase in the degree of anemia, granulocytopenia, or thrombocytopenia following the phosphorus therapy. The doses of radioactive phosphorus varied between 1.5 and 4 mc., the largest total dose in the period of a year being 17 mc. The processes of bone destruction in the skeleton were apparently not affected by the radioactive phosphorus therapy.

The authors plan to continue with their studies and suggest that they may use larger doses of radioactive phosphorus.

HENRY C. BLOUNT, JR., M.D.

MISCELLANEOUS

CLINICAL ENTITIES—GENERAL PHYSIOLOGICAL CONDITIONS

Quantitative Diagnosis of Acute Hemorrhage (El diagnóstico cuantitativo de la hemorragia aguda). José Schavelzon. *Prensa méd. argent.*, 1951, 38: 2631.

The author states the well known fact that at present there is no single laboratory test which will accurately measure the amount of blood loss in acute hemorrhage. The effects of acute hemorrhage are hypovolume and hemoglobin deficit, and, of the two, the former is least tolerated. However, the latter, if long maintained, leads to irreversible changes due to anoxia and parenchymal necrosis.

The body reacts to acute loss by vasoconstriction, release of blood from the storage organs such as the liver and spleen, and restitution of the volume from the interstitial fluid. Vasoconstriction is regulated by the vasomotor center which is influenced in turn by chemical factors such as oxygen reduction, carbon dioxide increase, and metabolic acids; it is also influenced by nervous mechanisms of somatic, visceral, and vascular origin, endocrine influences, and the axon-reflex of Houssay (the propagation of a stimulus from one nerve branch to another without the intervention of a cell center). Clinically, these physiological effects can be translated into the psychic state of the patient, the previous organic condition of the liver, heart, and kidneys, the constitutional type of the patient, since hemorrhage tolerance is poorer in the plethoric individual than in the asthenic type, and environmental temperature, as extremes of cold provoke great heat loss and high heat effects deleterious vasodilatation.

The effect of hemodilution expressed as the hematocrit reaches its maximum 96 hours after the hemorrhage. By way of physiologic compensation, the oncotic changes produced by plasma proteins supplied to the vascular system by the lymphatics cause interstitial fluid to enter the circulation. This results in an actual hypertonicity of the interstitial fluid which provokes the passage of liquid from the interior of the cells. The practical result is that in case of hemorrhage not only blood but water and hypotonic electrolytes must be furnished or death of the cells will ensue because of hypertonicity. It is known that acute circulating hypovolume causes right cardiac dilatation and increases the pulmonary venous volume; thus, during thoracic surgery the added trauma may lead to acute pulmonary insufficiency.

In reviewing the data utilized to appreciate the gravity of the condition in hemorrhage, the red blood cell count is of no avail inasmuch as the difference between the peripheral count and the central red count may be nearly two million. This is further invalidated by a nearly 10 per cent error in the count involved in the technique. Nor is the pulse rate a criterion of the magnitude of hemorrhage since at first there is a fall in intra-auricular pressure (demonstrated by intracardiac catheterization) which causes a reflex bradycardia; it is only after the establishment of hemodilution that the intra-auricular pressure becomes re-established and a reflex tachycardia occurs. The ventricular pressure may remain constant until collapse or death. Also in the same patient, an initial tachycardia of 140 may, upon a subsequent or continued hemorrhage, become fixed at 100 with little or marked fluctuation in the blood pressure and a deceptive clinical picture may ensue, which is dispelled only by the subsequent evolution of the case. The author reports a fatal case in which the patient exhibited a systolic pressure of 130 up to the very last, concealing an enormous blood loss which was discovered at autopsy.

Studies in venous pressure indicate a fall with hemorrhage and a rise with transfusions. The author advises suspension of transfusion if the jugular veins become greatly distended as acute pulmonary edema may ensue. Increased venous pressure will automatically retard the rate of drops from the transfusion flask; therefore, one must inspect the jugular veins before raising the flask or using air pressure to accelerate the flow. There is no impunity to massive or accelerated transfusions.

Careful and meticulous hemostasis is still imperative in any surgical procedure. Determination of the blood volume by means of intravital dyes cannot apply to hemorrhage in which many factors are at work to disrupt the result. Finally, the determinations of blood proteins and hematocrit readings, if done in sequence sufficiently often, may give some index of the prognosis involved. The practice of weighing sponges during extensive surgery to evaluate blood loss yields only relative results as the effects of surgical trauma, anoxia, hepatic status, visceronervous reflexes, and intrinsic clotting mechanisms all bear on the case. Added to this, in the recent practice of operating on patients under controlled hypotensive states to reduce surgical bleeding in formidable procedures, one is impressed that of all the battery of tests none can replace clinical judgment which is most difficult to acquire and easy to lose. Miguel Drobinsky, M.D.

Eosinophils, Their Circulating Levels and Their Use as an Index of Prognosis in Surgical Shock. N. K. Koang, K. I. Ou, T. I. Wang, K. L. Tch'en, and M. I. Hiu. *Chin. M. J.*, 1951, 69: 369.

The authors present an interesting study of the levels of eosinophils in 75 cases of surgical shock.

Preoperative tests were performed in a group of 8 patients with adrenalin (0.3 mgm. given subcutaneously) and in another group of 6 patients with ephedrine (0.06 gm. given orally).

It was found that in the acute diseases, under stress of pain, inflammation, and anxiety, the eosinophils are already at a low level. Four hours after operation there is usually a sharp fall of the eosinophils, reaching zero in certain cases. The fall of the eosinophils is proportional to the severity of the surgical shock.

From 3 to 7 days after the operation, there is a rise of the eosinophil level, showing the convalescence. The rise is sharp in minor operations and slow in major and severe shock. There are some fluctuations of the curve before it goes to the initial level.

It is pointed out that before operation in selected operative cases the patients are not under stress, so the levels of the eosinophils are nearly at a normal range. In the emergency operative cases, all the patients are under stress and an overactivity of the adrenal cortex with increased corticoid secretion occurs. The fall of eosinophils after operation can be interpreted as an additional effort of the adrenal cortex to meet the new stress, namely, the surgical shock. Thus it would seem that it would be a good protective measure to use the corticosteroids in such cases to prevent adrenocortex exhaustion.

It was pointed out that the eosinophil count falls sharply after operation and remains low throughout the period of maximal adrenocortical stimulation because of the surgical shock or other complications; it rises when the stress is over and convalescence sets in. It would seem that the modifications of the eosinophile count could be more accurate as a prognostic index than the clinical signs. JOHN E. KARABIN, M.D.

Can Blood Coagulation be Affected by Percutaneous Administration of Hirudoid? Critical Review (Kritische Betrachtungen zur percutanen Beeinflussbarkeit der Blutgerinnung durch Hirudoid). KURT SPOHN and GERHARD PESCHEL. *Chirurg*, 1951, 22: 481.

A new substitute for dicumarol, heparin, or thrombozid must offer the advantage of greater ease of administration or greater efficiency. Hirudoid ointment seems to be such a preparation as judged from the authors' experience with 50 cases of thrombophlebitis. The employment of hirudin has been given up because of its toxicity. The active substance of the hirudoid ointment, however, derives from mammalian organs and not, like hirudin, from leeches. The chemical constitution of the active substance is still unknown.

An ether extract of the salve prevented blood coagulation in vitro. Surprisingly, the ointment base alone displayed a similar effect, possibly because of the presence of glycerine.

The prothrombin time and the coagulation time of plasma were not prolonged after inunction of the salve in 10 normal individuals. However, a prolongation of the blood coagulation time could be demonstrated when a modification of the customary test was employed. The effect lasted less than 24 hours. The ointment base alone had no such effect in vivo.

The mechanism of the effect of the ointment remains obscure. An effect on thrombin or thrombokinase appears probable.

A single application of 6 gm. of the ointment prolongs the blood coagulation time from 45 to 50 per cent. An increase of the dose or repeated applications do not intensify this effect.

The authors believe that the effect of the ointment is not intensive enough to be of prophylactic value, but that it could come into consideration for therapeutic purposes in conjunction with dicumarol and thrombozid in the treatment of phlebothrombosis. The ointment displays an astonishing local effect by relieving pain and the sensation of tension in the affected extremity and is the drug of choice in the treatment of thrombophlebitis of the superficial veins. JOSEPH K. NARAT, M.D.

Serum Protein and Tissue Protein, with Special Reference to Conditions of Protein Depletion. OLE JACOB BROCH. *Acta med. scand.*, 1951, 141: 6.

It is generally concluded that the serum proteins alone will not give a correct indication of the state of protein nutrition of a patient. The purpose of this study was to ascertain whether and in what manner simultaneous analyses revealed a correlation between the serum protein and the tissue protein. Twenty-eight patients with prolonged illness and a considerable degree of undernourishment were studied. All came to autopsy except one. A blood sample was taken for determination of the serum protein a few hours before death. At autopsy a large piece of tissue was removed from the femoral muscle and from the liver, and these specimens were subjected to the Kjeldahl method of analysis.

The mean figure for the total serum protein was 6.16 per cent and for the serum albumin, 3.31 per cent. If 6.3 per cent is taken as the lower limit for the total serum protein, 16 patients showed a pathologically low figure. The percentage of protein in the liver showed a wide variation, from 13.6 to 20 per cent; the variation in the muscle ranged from 11.5 to 23.8 per cent. These wide variations in tissue protein values correspond to the protein content in the muscle of normal individuals as reported by Locatio.

It is concluded that under both pathological and normal conditions, the protein concentration in the tissues varies to a considerably greater degree than that in the serum. The total serum protein showed no parallelism with the protein content of either the muscle or the liver. The protein concentration in tissue, however, does not give any information about how much protein is mobilized. In conditions of protein depletion, the concentrations in the serum and tissue will show great variations independent of each other.

CURTIS ARTZ, M.D.

Hodgkin's Disease of the Stomach with Free Perforation and Apparent Surgical Cure. JOHN L. ATLEE, JR., PAUL J. ROWAN, and EDWIN E. ZIEGLER. *Ann. Surg.*, 1951, 134: 1052.

The case of a patient with ulceration and free perforation in gastric Hodgkin's disease is presented. The perforation occurred in the prepyloric area on the anterior aspect of the lesser curvature. No other abnormalities were present in the abdomen. Treatment consisted of emergency subtotal gastric resection. The patient is living and well approximately 8 years later. No radiation or chemotherapy was used.

The authors state that this is the thirty-second case of Hodgkin's disease of the stomach in the literature and the first reported case with perforation. FREDERICK W. PRESTON, M.D.

The Individual Essential Amino Acids in the Plasma and Urine of Surgical Patients. TILDEN C. EVERSON and MARY JANE FRITSCHEL. *Surgery*, 1951, 30: 931.

The authors studied the individual essential (free) amino acids in a group of surgical patients. Quantitative determinations of the ten individual essential amino acids in the fasting plasma were made and reviewed. Sixty-three patients were studied, 38 of them having a poor nutritional status and 25, a good nutritional status. Determinations of the hematocrit, nonprotein nitrogen, and serum albumin and globulin were also made.

The study revealed no statistical difference between the average values of the individual amino acids in the group of well nourished patients and in normal individuals studied by Hier, except for histidine, which was lower in the well nourished surgical patients. However, in the poorly nourished surgical group the mean values were statistically lowered, with the exception of the value for arginine. The plasma levels of isoleucine, histidine, and lysine were reduced in 50 per cent of the malnourished patients by more than 2 standard deviations. It is suggested that the level of these three acids or the total level of the ten essential acids would be very important in the diagnosis of protein malnutrition. The levels of individual amino acids did not appear to be influenced by high protein diets immediately preceding the determinations. It seems probable that some type of equilibrium exists between the free amino acids of plasma, the free amino acids of tissue, and tissue protein.

The authors conclude that decreased levels of the individual essential amino acids of plasma may be an earlier biochemical indication of malnutrition than the measurement of the blood albumin level. Differences in the amount of the decrease in these acids suggest investigation of the possibility of accelerating protein synthesis in malnourished patients by adding these acids, especially methionine and isoleucine, to the patient's diet. DONALD C. GEIST, M.D.

Cat-Scratch Disease: Nonbacterial Regional Lymphadenitis. WORTH B. DANIELS and FRANK G. MACMURRAY. *Arch. Int. M.*, 1951, 88: 736.

The author calls attention to a new disease occurring in persons who have been scratched or have had contact with cats. There appears at the site of the scratch a vesicle or pustule which is followed by regional lymphadenitis. The latter may proceed to suppuration.

Despite the fact that the cat has been incriminated, evidence points to the probability that the disease organism is only transmitted by the cat who has acquired it from her natural prey, such as the rat, mouse, or bird. Epidemics have been reported, all cases being traced to the family cat.

Immunological tests have been inconclusive except for a positive complement-fixation reaction to lygranum (a chick embryo antigen preparation used in skin tests for lymphogranuloma venereum).

More recently it has been possible to transmit the disease from human beings to monkeys by intracutaneous inoculation of emulsions made from infected lymph nodes. When sections of the primary skin lesions and lymph nodes in man and monkeys were prepared with the Giemsa stain, basophilic "granulocorpuscles" were found in reticulocytes, plasma cells, and lymphocytes. These bodies were seen in the cytoplasm and were considered to be inclusion bodies and the visible forms of the causative virus.

A summary of 12 cases of patients suffering from cat-scratch disease is reported, and the evidence indicates that the disease is ubiquitous and may frequently be confused with more serious illnesses. A cervical form of the disease is common, the majority of patients having fever and systemic symptoms. The disease, however, is indolent and self-limited, lasting from weeks to months.

STEPHEN A. ZIEMAN, M.D.

Pilonidal Cysts and Sinuses. LOUIS T. PALUMBO, O. M. LARIMORE, and I. A. KATZ. *Arch. Surg.*, 1951, 63: 852.

It is generally agreed that the presence of a dead space provides the greatest obstacle to healing after primary closure following excision of pilonidal cysts or sinuses. Added factors which prevent healing inherent in the area of the wound include excessive moisture, motion, and trauma.

The authors present a series of 171 patients treated surgically for pilonidal sinuses or cysts during a 3-year period with a follow-up ranging from 9 to 44 months. Of this group, 150 patients were treated by the open method of excision and packing of the wound, 16 by marsupialization, and 5 by excision followed by primary closure. It is significant that the open method of treatment resulted in a satisfactory cure rate of 94.7 per cent.

It is suggested that this evaluation demonstrates that the open method of excision and packing results in the greatest number of cures of pilonidal cysts and sinuses. ORVILLE F. GRIMES, M.D.

Therapeutic Action of Mustard Gas on Epithelial and Connective Tissue Malignant Tumors (Sull'azione terapeutica di alcuni derivati dell'azoiprite nei tumori maligni epitheliali e connettivali). V. Pricolo and S. Di Pietro. *Tumori*, Milano, 1951, 37: 385.

The substances used in the treatment of tumors at present can be divided into three groups, namely: substances which alter the humoral substratum of the tumor (male and female sexual hormones); substances that become an active part of the metabolism of the neoplastic cells (aminopterin and I_{131}); and substances which inhibit cellular division or arrest the evolution of the neoplastic tissue (mustard gas).

The authors review the literature concerning the treatment of tumors with mustard gas and report 45 cases (11 of cancer of the lung, 16 of cancer of the oropharynx, and 5 of cancer in other locations, 2 sarcomas, 5 lymphosarcomas, and 1 case of mycosis fungoides) which were treated by them with methyl bis amine hydrochloride given by the intravenous route and naphthyl bis amine hydrochloride given by the oral route.

The conclusions of the authors are as follows:

1. Mustard gas treatment of epithelial and mesenchymal tissue neoplasms is a palliative measure.

2. Carcinomas of the lung, especially those of the undifferentiated type, are more sensitive to mustard gas; the patient improves temporarily. Sixteen months was the longest period that the patients lived after the treatments.

3. A favorable result, when obtained, consisted in the reduction in size of the metastatic lymphatic nodules.

4. Lymphosarcomas seem to react favorably, the results being second only to those obtained in Hodgkin's disease.

5. Sarcomas are not influenced by mustard gas therapy.

6. In reticulosarcomas any improvement is rare and transient.

7. In a case of carcinoma of the rhinopharynx with large submandibular metastases, the treatment was followed by x-ray therapy with good results.

8. The drug given by the intravenous route is more efficacious than the drug given orally; however, no toxic effects developed from either one.

9. Whenever a tumor is found to be sensitive to methyl bis amine hydrochloride it is advisable to use moderate doses and, if necessary, repeat the course.

10. Infiltration of the metastatic lymphatic glands with the drug causes histological changes similar to those obtained when the drug is administered by the intravenous route.

11. The different reactions to the drug by the same type of tumors may be due to the location of the neoplasm as well as to their difference in sensibility.

12. Mustard gas, although only a palliative measure in malignant tumors of the connective tissue and epithelium, has given better results in cases of tumors of the lungs and lymphosarcomas, in which cases it has improved the symptoms and prolonged the life of patients.

Joseph M. A. Pape, M.D.

Biology of the Skin Graft. Lorenzo Mir y Mir. *Plastic & Reconstr. Surg.*, 1951, 8: 378.

A new biological concept is advanced in regard to the revascularization of free skin grafts. In the thin split grafts (Thiersch) vascular nutrition is effected only by capillary or angioblastic invasion. In the thicker grafts an anastomosis is formed between the vessels of the graft and those in the new bed. The thin Thiersch graft has little nutritional requirement and therefore the process of "plasmatic circulation" is sufficient.

The tension at which a free skin graft must be placed is in inverse proportion to its thickness; the thinner the graft the greater may be the tension without damage to its viability. The pressure upon the graft helps it "take" for two reasons: (1) it applies the graft and holds it in contact with the recipient site, and (2) it obtains immobilization of the zone.

Cold causes a decrease, or even an inhibition, of the degenerative processes that follow the transplanting of skin, and, because of this, the author believes that the thicker the graft is, the better the results from the application of cold.

Ely Elliott Lazarus, M.D.

EXPERIMENTAL SURGERY

The Anterior Chamber of the Eye for Investigative Purposes. Joseph T. Dameron. *Surgery*, 1951, 30: 787.

The author reports recent work in which the anterior chamber of the eye has been used in the study of (1) tissue reaction to foreign materials, (2) the homologous transplantation of fetal endocrine tissue in adult nonrelated hosts, and (3) the heterologous transplantation of human cancer.

Early embryonic tissues apparently do not develop tissue specificity. Fetal tissues present autonomy and may be transplanted homologously to the anterior chamber of the eye with indefinite survival. Fetal transplants of the adrenal gland, ovary, testis, and thyroid tissue have been made in the dog, guinea pig, and rabbit. One may expect a 50 to 60 per cent survival and continuous growth of the homologous embryonic transplants to the recipient animals. A series of photomicrographs illustrate that fetal endocrine transplants of the adrenal gland, ovary, testis, and thyroid tissue grow and differentiate from the fetal to the adult form and function within the host.

The author also presents data concerning 2 cases of human thyroid cancer and human malignant melanoma which were successfully transplanted to the anterior chamber of the eye of the guinea pig.

Orville F. Grimes, M.D.

Microscopic Observations of the Living Mammalian Kidney; The Effect of Crush Injuries, Shock, and Adrenalin on the Cortical Blood Flow. J. F. Ross Fleming and W. G. Bigelow. *Surgery*, 1951, 30: 994.

The authors report their experimental studies of the so-called "crush syndrome." The true syndrome could not be reproduced, only a mild crush syndrome.

The experiments were done in rabbits with crushing injuries, tourniquet experiments, burns, hemorrhage, and adrenalin with observation of the blood flow in the cortex of the kidney. The latter was accomplished by means of a microscope and a lighted quartz rod inserted beneath the cortical substance. The vessels observed were the interlobular, or radial artery and vein.

Slowing of the blood flow with constriction of the vessels, stasis, and intravascular agglutination was observed in studying the animals with burns, crushing injuries, and tourniquet shock. Slowing or intermittence and at times a reversal of the blood flow were noted. Hemorrhage caused increased constriction of the arterioles and venules but with a fairly rapid flow of blood through them. Injections of adrenalin resulted in marked vasospasm and stasis of the cells. Large doses caused complete cessation of the blood flow.

It is believed that the study furnished indirect proof of the hypothesis that renal failure in "crush syndrome" is due to blockage of the cortical kidney vessels by agglutinated clumps of cells in the presence of vasospasm. Donald C. Geist, M.D.

The Effect of Locally Applied Cortisone Acetate on the Survival of Skin Homografts in Rabbits. R. E. Billingham, P. L. Krohn, and P. B. Medawar. *Brit. M. J.*, 1951, 2: 1049.

Skin homografts, transplanted in a stated fixed dosage, between rabbits of high genetic diversity, survive their transplantation for 6 to 9 days. The local application of 5 mgm. of cortisone to such homografts, every third day at least, doubles their survival time. The dosage of cortisone that is effective when applied locally is not effective when administered systemically.

The local application of cortisone to homografts is almost wholly ineffective when the grafts are transplanted to a rabbit preimmunized by an earlier grafting of skin from the same donor or concomitantly immunized by untreated homografts transplanted on the same occasion.

The principal action of cortisone on homografts is to retard the development of immunity toward them. Cortisone also has a slight but discernible effect in preventing the local expression of the immune state. If cortisone is to be used by local application to homografts in clinical practice, it must be applied to all the homografts transplanted to any one patient. Samuel Kahn, M.D.